SUNSYS – B10

Installation and Operation Manual

socomec
Innovative Power Solutions SOLAR

Before you start

Congratulations on your purchase of the photovoltaic inverter for grid connection SUNSYS – B10 (which will referencs herein as “PV inverter” or simply “the device”).
The PV inverter is a highly reliable, thanks to its innovative desing and excellent quality control, the device has been designed to meet the high demand for PV system connected to a main phase. Moreover, this product is IP 65 approved (dusty or humid), and especially suitable for outdoor use.

This manual contains important information about installation and safe use of this unit. Prior to use the PV inverter to read this manual carefully.
In case you encounter any difficulties during installation or use of the device, consult the manual before contacting your dealer or local representative. Thanks again for choosing our product.
Keep this manual handy for quick reference. Begin to enjoy Sunsys – B10 and pro life!

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1. SAFETY INSTRUCTIONS

RISK OF ELECTRIC SHOCK

Alternating Current (AC) and Direct Current (DC) sources are terminated in this device. To prevent risk of electric shock during maintenance or installation please ensure that all AC and DC terminals are disconnected. Be sure to secure the Ground line to the Grid's Ground, and double check the Line and Neutral are not confused with Ground.

HANDLING OF INVERTER

Only authorized personnel are allowed to handling the PV inverter. When PV module or panel is exposed to light, it starts to supply high DC voltage, be sure to turn off DC switch before servicing, or make sure no live part will be touched.

After disconnecting the PV inverter from the power supply and PV modules, electrical charge can still reside in the DC link capacitors. Before handling the device, please allow at least 10 minute after the power is disconnected.

PUBLIC UTILITY ONLY

The PV inverter is designed to feed AC power directly to the public utility power grid. Do not connect the AC-output of this device to any private AC equipment.

Hot Surfaces:

Although designed to meet international safety standards, the PV inverter can become hot during operation. Do not touch the heat sink or peripheral surfaces during or shortly after operation.

1.1. Maintenance and Technical Support PV inverter

Only authorized personnel are allowed to open the Inverter for service purpose.

CAUTION :

Risk of electric shock from energy stored in capacitor, do not remove cover until 2 minutes after disconnecting all sources of power supply.

1.2. Unpacking and Installation:

The ***SUNSYS – B10*** grid-tied PV inverter may weighs up to 57kg. To avoid injury and for safety purpose, be sure to use proper lifting techniques and secure the help of someone to assist in the unpacking and installation of the Inverter.

2. MANUFACTURER'S WARRANTY

WARRANTY ON PRODUCTS IN THE SERIES ***Sunsys pro***

Sicon S.r.l., part of the group that deals with Socomec, control and security of electricity grids in low voltage, with registered office in Silas 1/3 - Z I. Scovizze, Isola Vicentina 36033 Vicenza (VI), warrants its products in the series ***Sunsys pro*** are new and meet both the specifications and such regulations as applicable.

Terms of warranty

Sicon S.r.l. warrants its products Sunsys pro series for a period of 5 years from their purchase only to defects in manufacture or materials.

The period of validity of this guarantee is calculated from the date of purchase of the new product by the end user at a official dealer (by the date stated on the purchase document). This warranty is valid only for products installed in Italy.

The warranty includes:

a) repair or replacement of the defective product or component, but with shipping and installation of the product or component replacement by the customer or end user;

b) sending to Sicon S.r.l. (Or any authorized service centers) with removal of the defective product, transportation and related fees customer or end user.
The decision to repair or replace the defective product or component will be responsible solely and exclusively to Sicon S.r.l.
The replacement of parts, repair parts, modifications, or components of the product during the warranty period is not prolong the duration of the warranty.The standard warranty is additional and not in lieu of any other rights enjoyed by the consumer / purchaser of the product and, in particular, without prejudice to the rights that the consumer is the holder pursuant to Legislative Decree 06.09.2005 n. 206 (cd.Consumer Code). Sicon S.r.l. reserves the right to offer extensions of this warranty to be agreed in writing.

Procedure.

1. Defects must be reported to the Department of the Post-Sale of Sicon Photovoltaic Ltd (By Silas 1/3 - Industrial Zone Scovizze – Isola Vicentina 36033 Vicenza - Vi -) 800.00.80.85 toll free or in writing by registered mail or (Assistenza@socomec.com) or fax (0444-598626).In every case must be immediately provided to the Department predicted a brief written report indicating the type of defect, product serial number and all data contained in the same nameplate.
   In the written report must be accompanied by a copy of proof of purchase (document - note, invoice, sales slip tax - indicating the date of purchase and which should include the necessary data for identification of the product - model, serial number -). In case you can not provide such proof of purchase, will use the serial number and date production to calculate the expiration of the warranty. The defective product will be returned to Sicon Srl only after obtaining the return authorization number which will be released from service centers after receipt of notice of defect.
2. The defective product must be returned to Sicon Srl in the original or equivalent, attaching the authorization number the return.
3. Where assets are recognized and pampered under warranty, Sicon Srl will send the product and / or the component fixed to or in place end user at the address notified by them together with the reporting defects or, failing that, at the place where / the good / s have been delivered as specified in the contract of sale.
4. The shipment of the product and / or component replacement is the responsibility of Sicon S.r.l.
5. The installation of the product and / or component replacement should be performed by qualified personnel or by a service center authorized and the cost thereof shall be borne by the customer or end user.
6. All activities performed by Sicon S.r.l. of products and / or components not under warranty, shall be paid at Sicon S.r.l. in accordance with the rates and conditions normally applied by itself.
7. Sicon S.r.l. reserves the right to provide a different model of product and / or component provided equivalent performance in the case where the original model - spoiled and warranty - is out of production.
8. In case of request for on-site staff that Sicon Srl, the costs of intervention and the cost of moving the Staff will be charged to the customer / end user at the rates Sicon Srl force.

Exclusions from Warranty

a. The guarantee referred to in this writing is excluded in case of product defects and / or components are made and / or arising from:

I. accidental damage.

II. negligent use, improper or inadequate product or component (limited use out of tolerance: temperature, humidity, poor ventilation).

III. Failure to follow instructions for installation, use and maintenance described in the Installation and User Manuals.

IV. modifications or attempted repairs made by anyone not authorized by the Department of Post-Sale of Sicon S.r.l.

V. failures due to lightning, floods, fires, earthquakes, riots, wars or other force majeure or derived from any other reason different from the normal conditions of operation of the inverter and which are outside the Control of Sicon S.r.l.

VI. damage caused by surges.

VII. corrosion damage.

VIII. inadequate transportation.

IX. failure to comply with standards set by the user.

X. he guarantee referred to in this writing is also included:

I. in the case in which the product and / or component is not vitiated returned to Sicon Srl in the original packaging or equivalent.

II. in the case where the serial number identification of the products has been manipulated or not it is uniquely identifiable.

III. in the case in which the defect relates to aspects relating to the aesthetics or construction of small entities that do not compromise the normal functionality of the product.

IV. are not covered by the warranty provided for in this write requests that go beyond the rights established by the warranty conditions and, in particular, claims for damages for loss of production, loss of profit, or due to product defects or due to the cost of installation or uninstallation.

Option Premium

Sicon S.r.l. offers the guarantee premium (optional and against payment) to be requested in writing to Sicon Srl and which provides for replacement of equipment within a maximum of 72 hours of the request on-site, made by a courier authorized by Sicon Srl, which will bear the costs of collection and transport equipment foul of the new. Disconnection and connection of defective equipment are not included in the new service and will be made by authorized and competent.

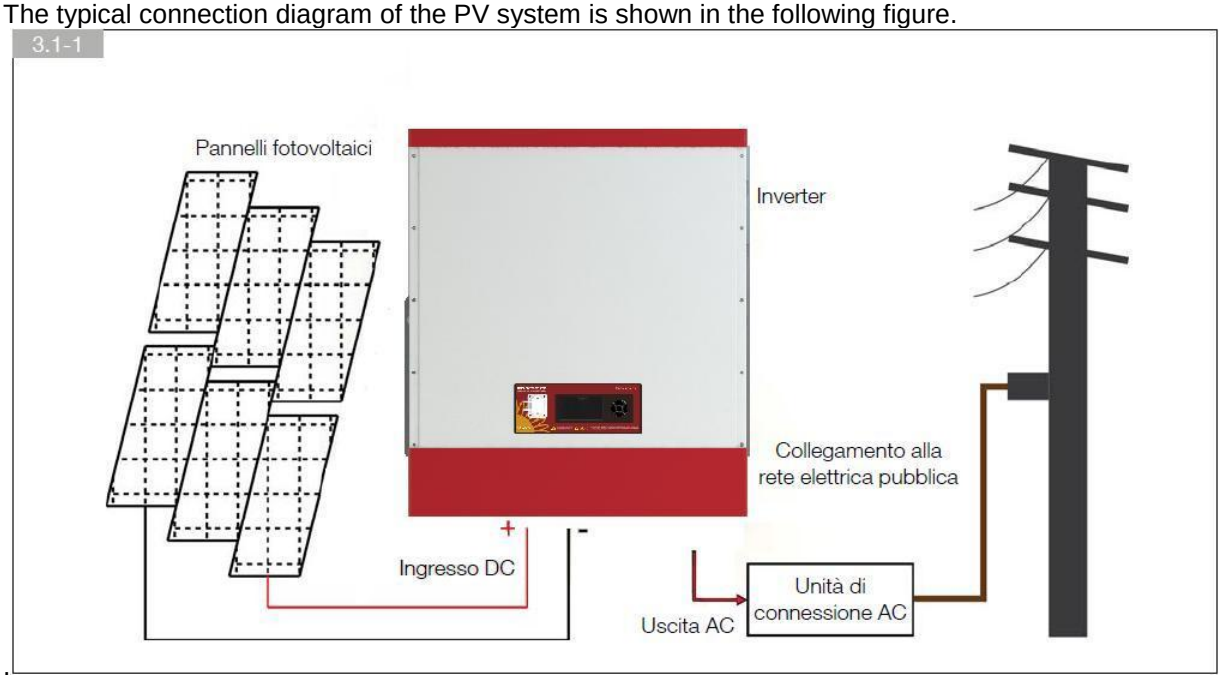
3. GENERAL DESCRIPTION

PV System Diagram

A Grid-tied PV System is mainly composed of 5 parts: PV panel or PV array, DC Junction Unit, the PV inverter, AC Junction Unit (connection Interface) and a connection to the Public Utility.

The typical connection diagram of the PV system is shown in the following figure.

3.1-1



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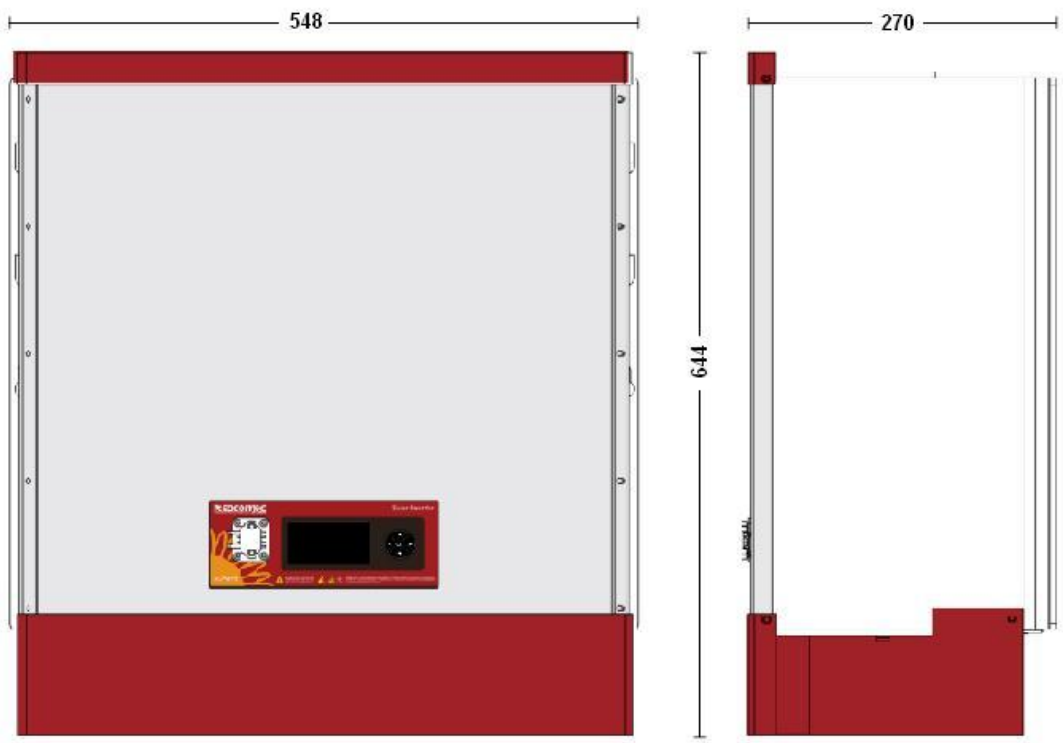
2.1.*SUNSYS – B10* presentation

SUNSYS-B10 grid-tied PV Inverters converts direct current (DC) power generated by PV modules into alternating current (AC), which is compatible with the local electricity distribution network; also called the public utility, or grid system.

2.1.1. *SUNSYS – B10* dimensions

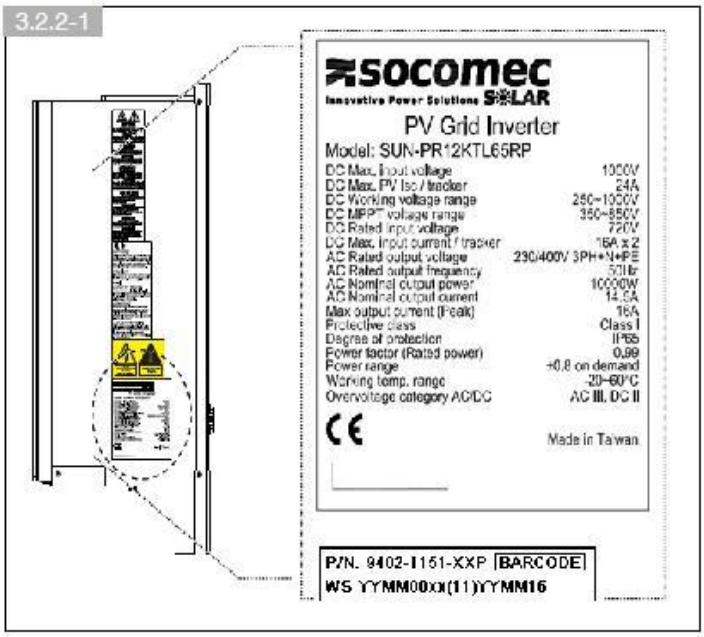
The dimensions are expressed in millimeters.

3.2.1-1



3.2.2. Identification

3.2.2-1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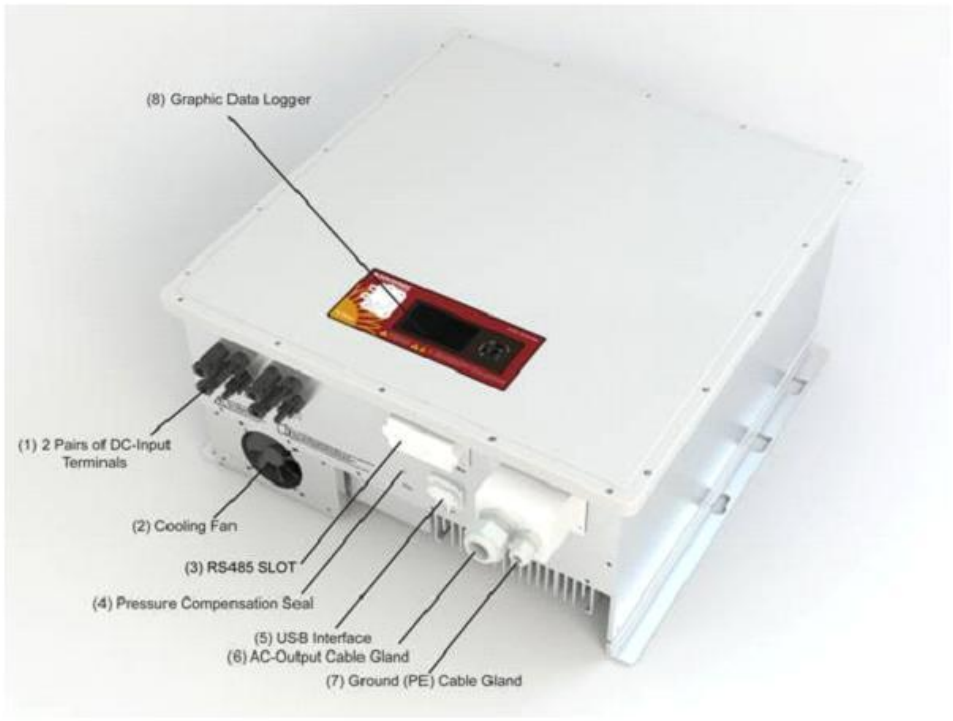
Innovative Power Solutions SOLAR
PV Grid Inverter
Model: SUN-PR12KTL65RP
DC Max. input voltage 1000V
DC Max. PV Isc / tracker 24A
DC Working voltage range 280~1000V
DC MPPT voltage range 350~850V
DC Rated input voltage 720V
DC Max. input current / tracker 15A x 2
AC Rated output voltage 230/400V 3PH+N+PE
AC Rated output frequency 50Hz
AC Nominal output power 10000W
AC Nominal output current 14.5A
Max output current (Peak) 16A
Protective class Class I
Degree of protection IP65
Power factor (Rated power) 0.99
Power range +0.8 on demand
Working temp. range -20~60°C
Overvoltage category AC/DC AC III, DC II
CE
Made in Taiwan
P/N. 9402-1151-XXP BARCODE
WS YYMM00xx(11)YYMM16

On the left side of ***SUNSYS-B10*** Grid-tied PV inverter shows the rating label of the Inverter. The rating label states the Type, Brand Name, Model Name, Specifications, and the Serial Number of the Inverter. When encounter any difficulties during installation or operation, please record the Serial Number (SN) before contacting your local dealer or representative.

3.2.3.*SUNSYS – B10* specific components

The descriptions of the major parts of ***SUNSYS-B10*** Grid-tied PV Inverter are indicated below:

3.2.3-1


(8) Graphic Data Logger
(1) 2 Pairs of DC-Input Terminals
(2) Cooling Fan
(3) RS485 SLOT
(4) Pressure Compensation Seal
(5) USB Interface
(6) AC-Output Cable Gland
(7) Ground (PE) Cable Gland

Part Name	Description
(1) DC-Input Terminals	Each input pair consists of positive and negative terminal
(2) Cooling Fan	External cooling fan for the inverter
(3) Optional Communication Slot and Cover	Optional communication slot .
(4)Pressure Compensation Seal	A hardware device that used to dissipating heat into the surrounding air
(5) USB Interface	Connect this port directly to your PC via an USB cable; users can communicate with the Inverter through specific program tool.
(6) AC Output Cable Gland	For wiring AC output cable to the grid with a waterproof enclosure
(7)Ground (PE) Cable Gland	For wiring Ground (PE) output cable to the grid with a waterproof enclosure
(8) Graphic Data Logger	Operation status display and system characteristic setting

3.3. Introduction of Graphic Data Logger

To show the information of Inverter, there is a graphic Data Logger in the unit. This Data Logger can show various information of the Inverter such as operational status and warning message, its button allow user to operate for display control or system characteristic setting

3.3.1. Graphic Data Logger Configuration

The following table indicates the main specification of the Data Logger:

LCD Display	Monochrome
Displayed Information	Each I/P power, O/P power, Operation mode and warning message
Storage Period	5 years
Storage Media	2GB SD card (support up to 32GB)
Data Download	Via B type USB

3.3.2. Features of Graphic Data Logger

Multicolored back light
The backlight of the LCD will be changed according to its status. There are 3 colors of backlight and their indications are:

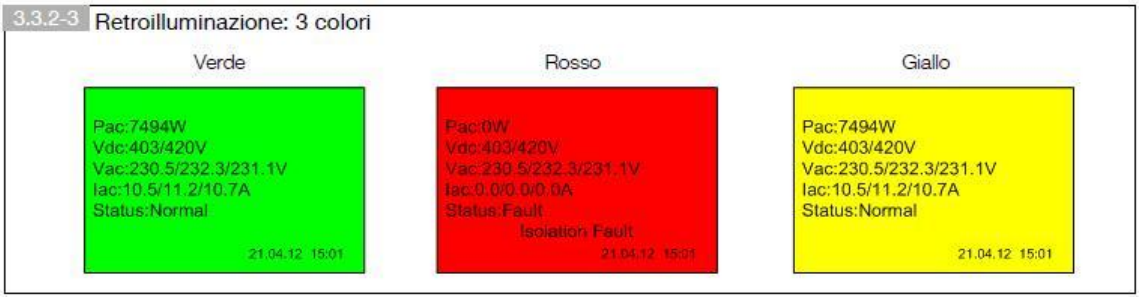
- **Green:** Start-up and normal status
- **Red:** Fault Status. In this status, Inverter disconnected from grid due to system fault or Inverter. These faults and failures are defined in “error message table” later on.
- **Yellow:** Warning Status. Inverter disconnected from grid due to system fault within the past 48 hours, but Inverter reconnected.

Data Logger

3.3.2-1 Display LCD: grafico128 x 64, monocromatico

3.3.2-2 Tastierino di navigazione: “↑”, “↓”, “→”, “←” e “OK” al centro

3.3.2-3 Retroilluminazione: 3 colori



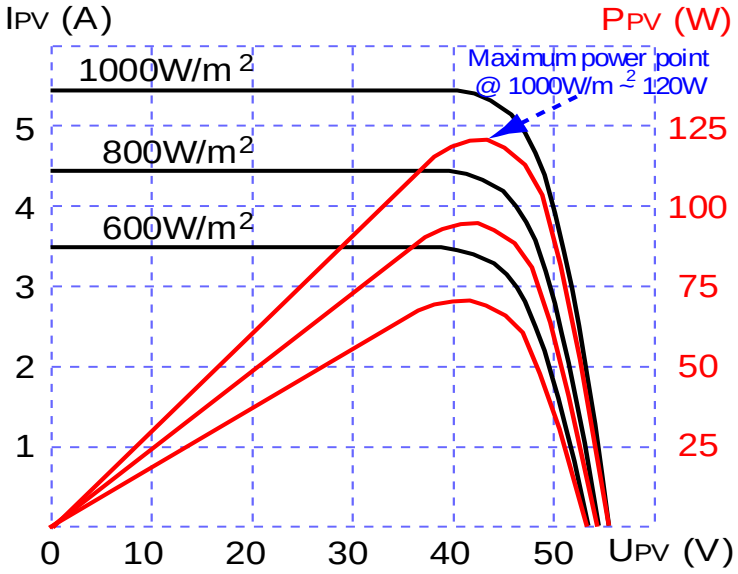
4. FEATURES OF *SUNSYS-B10*

This Inverter mainly has following features:

- Lead-free, RoHS GP2 compliant
- Max conversion efficiency ≧ 97.7%
- Euro efficiency ≧ 97%
- IP65 enclosure
- 128x64 graphic display
- 3-phase 4 wire, 230/400V
- Compact design
- Embedded ENS and fully complying with the following Grid codes
- CEI 0-21
- Integrated RCMU (Residual Current Monitoring Unit)
- Power Management for Active Power and Reactive Power Control
- 2 MPPT tracker

4.1. Maximum Power Point Tracking (MPPT)

A PV inverter must be able to convert the maximum power from any PV panel. Due to its advanced design, this PV inverter can track the maximum power from the PV panel in any condition. When the displayed power on the LCD output does not change dramatically, the Inverter is converting the maximum power from panels. When the LCD power reading is significantly changes, the Inverter is tracking the power according to the varied sunlight.



Note: When the PV panel's output is low, the feeding DC-power may drift slowly as does the AC power. It is because PV inverter is tracking maximum DC-power constantly.

5. INTALLATION INSTRUCTION

5.1. Inside the Package

After opening the package, please check the contents of the box.
It contains the following items:

1. N°1 Photovoltaic Inverter;
2. N°1 User's Manual;
3. N°6 Screw (M4 x 30L) with relative Nylon Drive Anchor;
4. N°2 Security Screw;
5. N°1 Mounting Bracket;
6. N°1 AC Cover;
7. N°2 Rubber Bushing.

5.2. Mounting *SUNSYS – B10* PV inverter

Advice before Installation
To obtain optimal performance, please consider following guidelines before installation:

Do not expose the PV inverter to direct sunlight. Direct sunlight increases the internal temperature that may reduce conversion efficiency.

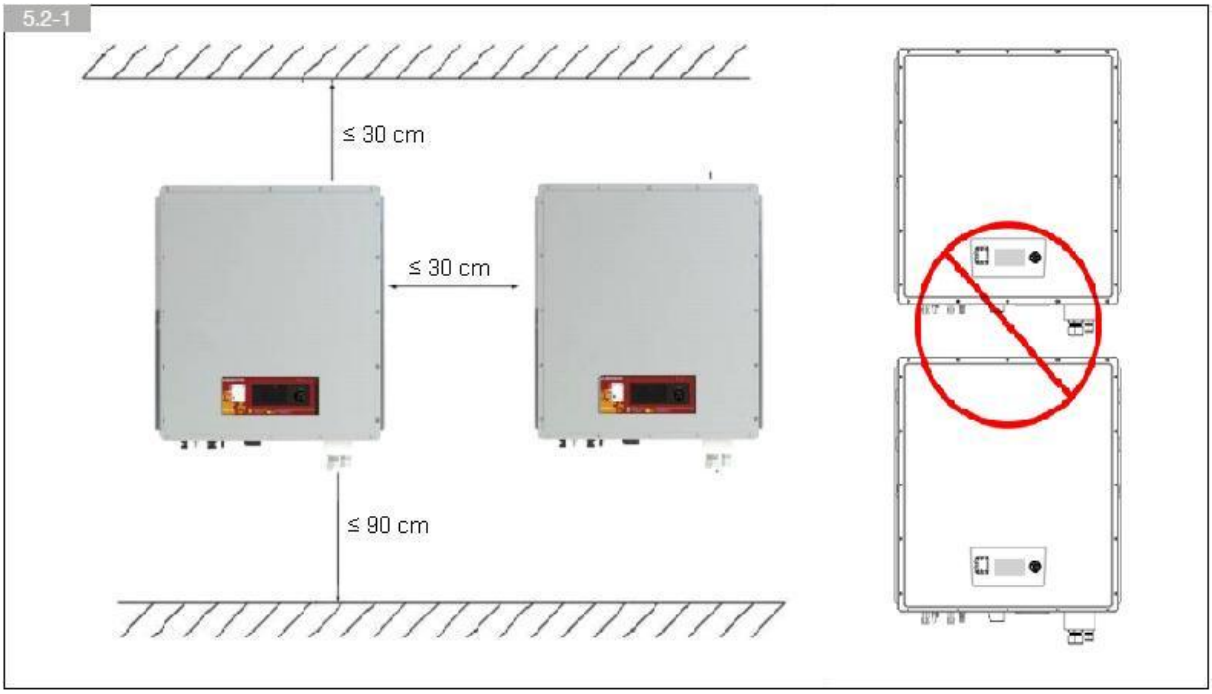
- Check the ambient temperature of installation is within specified range -20 ~ +60°C.
- The grid voltage and frequency at installed site must be within the specific range defined by applicable regulation type.
- Electric utility company has approved the grid connection.
- Only qualified personnel are performing the installation and maintenance.
- Adequate convection space surrounds the Inverter.
- Inverter is being installed away from explosive vapor or dust.
- No flammable object is near the Inverter.
- No mounting on wooden flammable surface.

SUNSYS – B10 grid-tied PV inverter can be installed and operated at locations where the ambient temperature is up to 60°C. However, for optimal operation, it is recommended that Inverter is installed where the ambient temperature is between 0 to 40°C.

Please be sure the installation rules listed below are followed.

1. Select a wall or solid vertical surface that can support the PV inverter in the long run.
2. PV inverter requires adequate cooling space. Allow at least 30cm space above and 90cm space below the Inverter.
3. For maintenance purpose, please keep Inverter 30cm distance at least from each other.

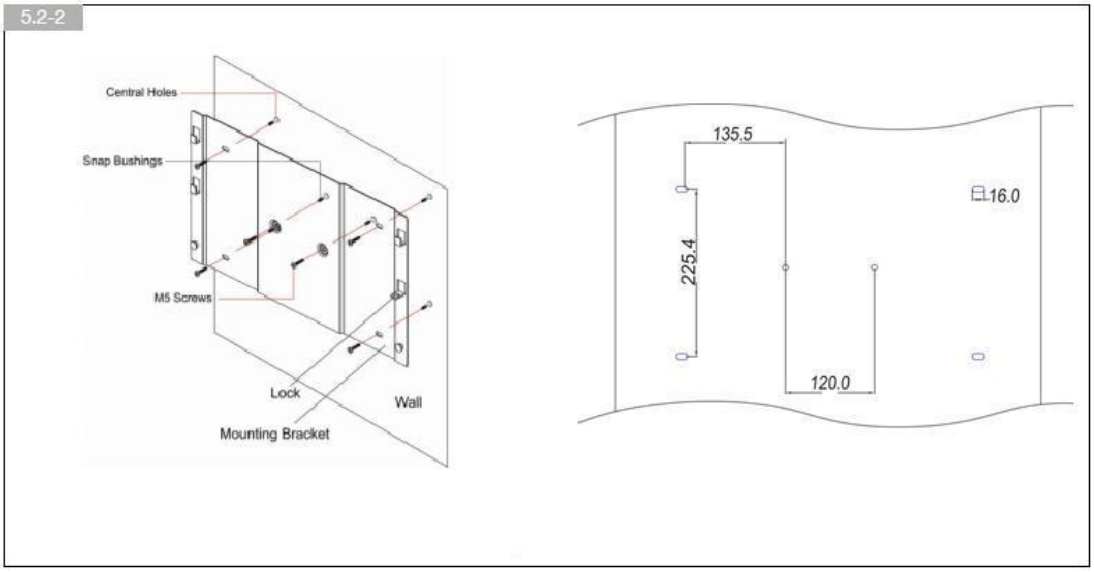
5.2-1



Note: Don't mount PV inverter on top of another one or other heat radiating sources unless it is inevitable, in that case, 100cm spacing at minimum from each other is required to provide proper ventilation effect.

A. Fix the Bracket by using all of six mounting holes, the bracket should be fixed with M5*30mm screws by 30kgf-cm (or 2.94 N-m) torque force, as illustrated below:

5.2-2

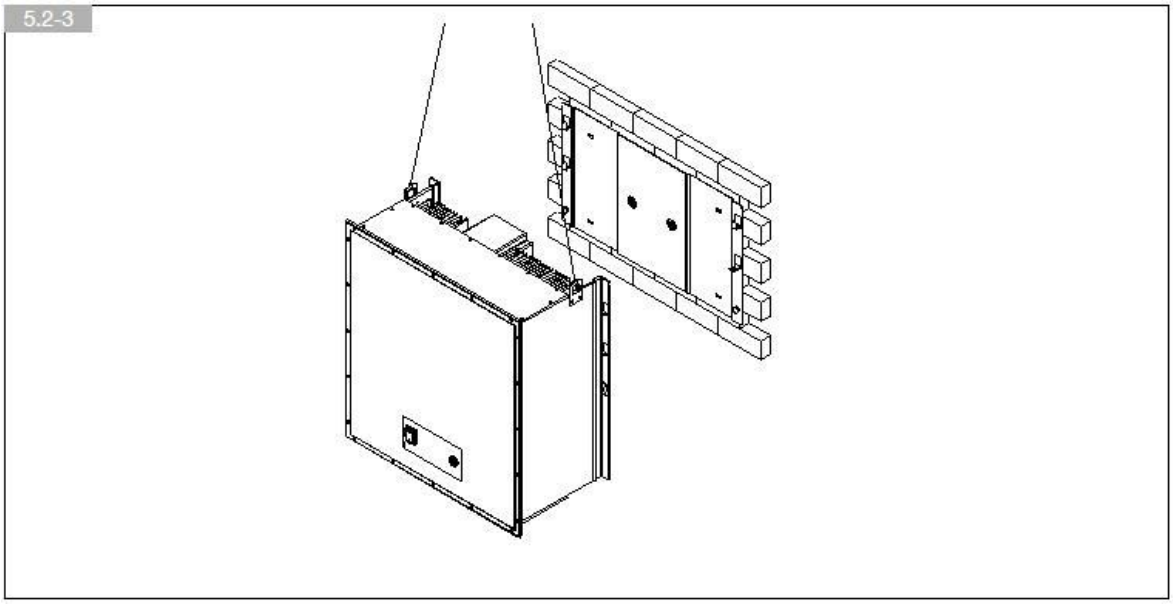


***Notes: Diameter for the safety screw is at 10mm.**

B. PV inverter will be able to lift up with the proper lifting tool in order to move PV inverter to the installed

location when the hanging irons installed on the PV inverter as illustrated:

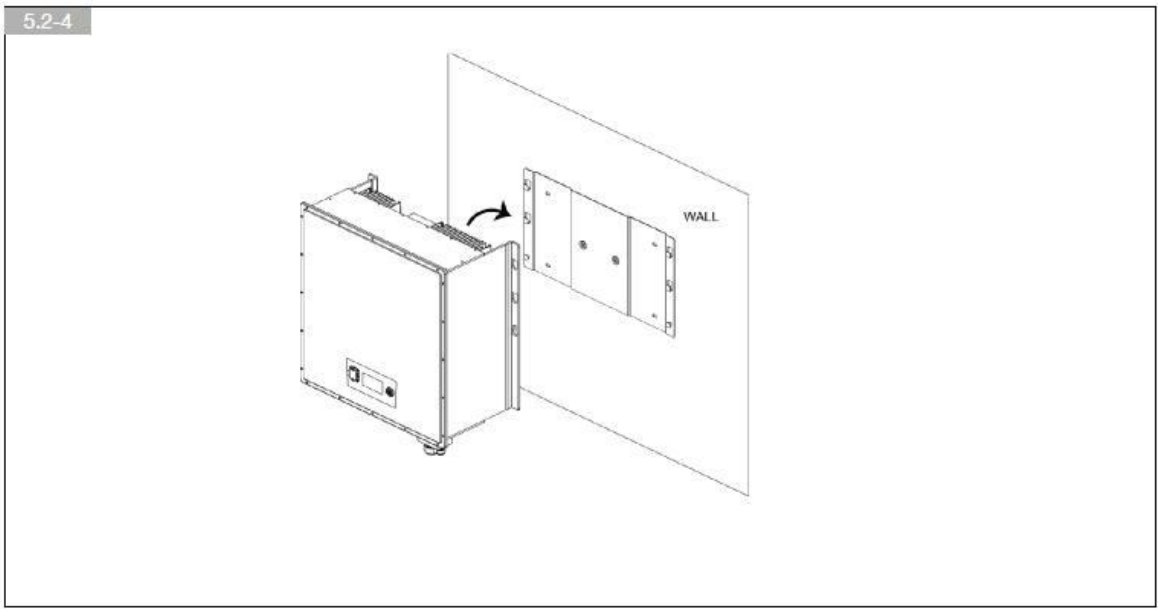
5.2-3



***Notes: Proper lifting tool must be used for the lifting, please beware.**

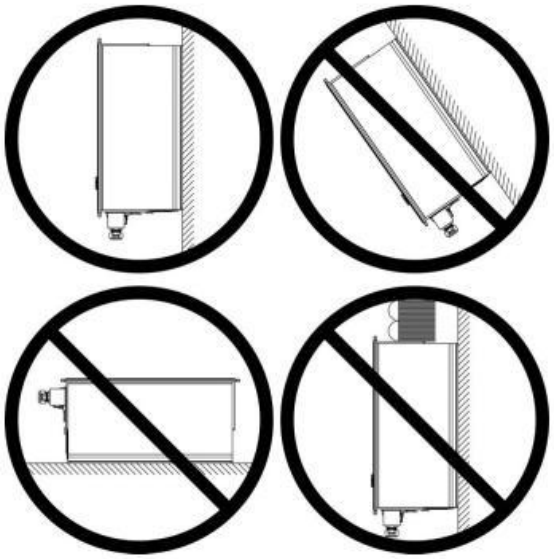
C. Mount the Inverter onto the bracket as illustrated:

5.2-4



D. Check and ensure the device is properly fixed to the bracket in the proper direction.

5.2-5



5.3. Connecting AC Output Cable

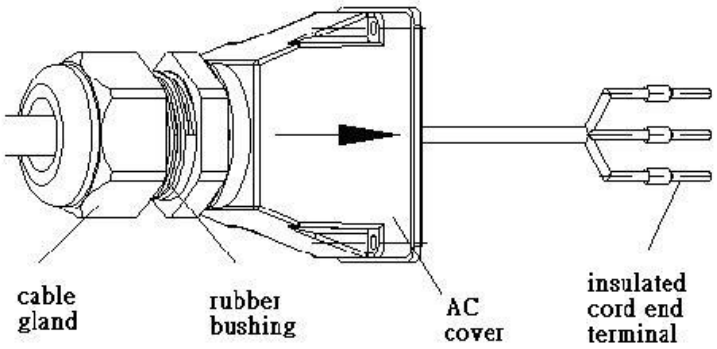
Connect PV inverter to the AC Junction Unit with AC output wires and ground wire as shown in the following steps:

1. Do not use cables where losses will exceed 1%
   L1(phase1), L2(phase 2), L3(phase3), N(neutron), PE(hearth ground): wires gauge 4/6 mm^2
   PE(hearth ground): wires gauge 10mm^2

2. Remove the rubber plug from inside of the AC connector socket

3. Insert all AC wires through AC cover kit in following order before cramped with insulated cord end terminal: → cable gland → rubber bushing → AC cover → cord end terminal

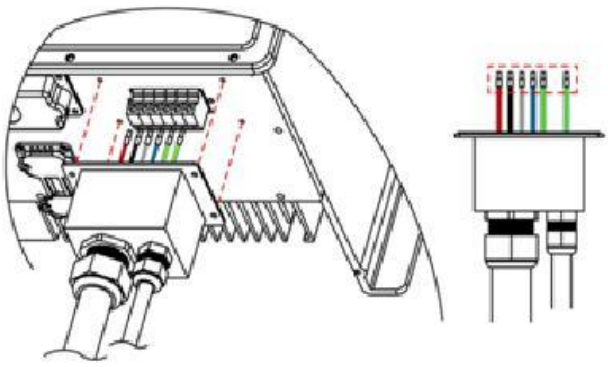
5.3-1



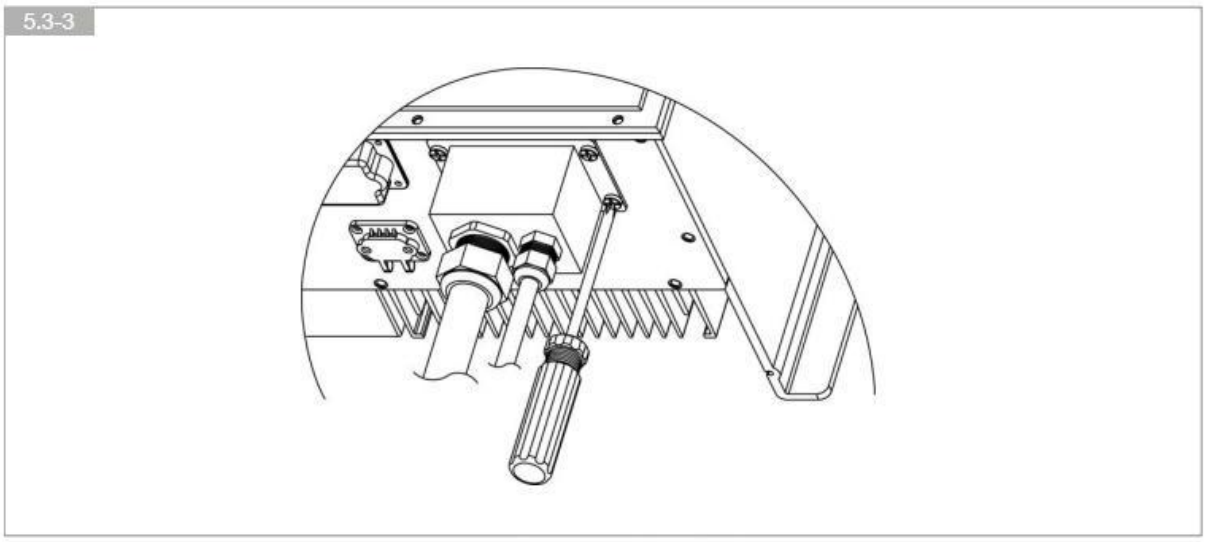
4. Connect the AC wires to the AC terminal block correspondingly and tighten it properly.
   PE2 wire area must be of same gauge as PE1 does (or 10 mm^2).

5. Add an insulated cord end terminal to each AC wire before connecting. The stripped length of AC wire is about 10 mm to 12 mm.

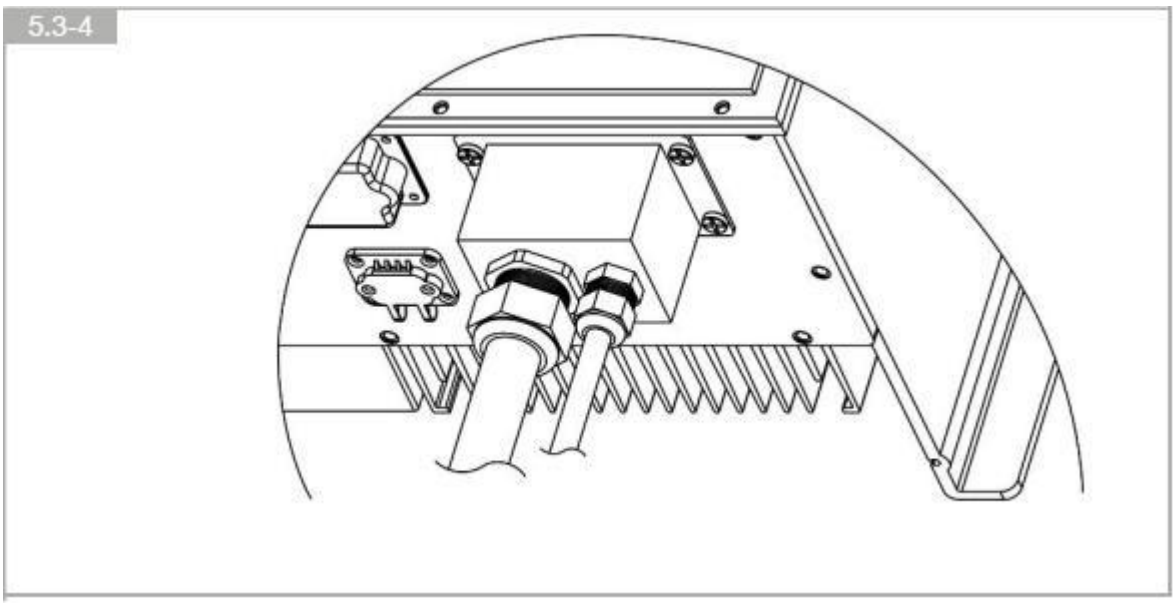
5.3-2



6. Fix the AC output cover back with a screwdriver.



7. Twist the connector cable gland to lock the bushing and cable together firmly.



8. Check the installation condition again.

- ✓ Do not install the PV inverter on a slanted surface
- ✓ Check Inverter are securely hooked on bracket at both of upper and lower sides.

5.4. Connecting of the PV Modules

For connecting DC input of one single Inverter, connected strings must consist of modules of the same type. Do not share the DC input connection with other Inverter. The number, orientation, and tilt of panels may differ for different application.
The input terminals on the Inverter are Multicontact MC4 DC connectors. Appropriate cable couplers from the same manufacturer should be used for DC input connection.

The following table lists those connector pairs:

Item	Dimension of the wire	Maximum nominal current
	Maximum gauge $6mm^2$	30 A
	Maximum gauge $6mm^2$	30 A

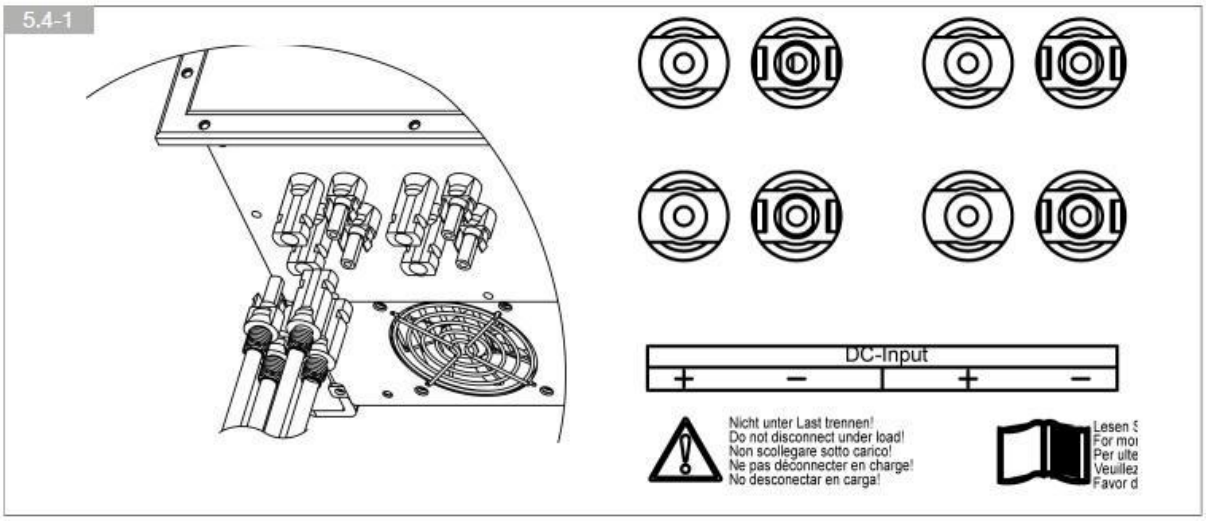
Advice before connecting of PV module

To obtain optimal result from PV inverter, please consider the following guidelines before connecting the PV modules to the device:

1. Firstly make sure the maximum open circuit voltage (Voc) of each PV string does not exceed the related specification as below table listed in all condition.

2. Check short-circuited current of the PV string. The total short-circuits current ($\mathbf{I_{sc}}$) of the PV string should not exceed the Inverter's maximum DC current.

3. Always connect PV modules positive (+) terminal to PV inverter DC positive (+) terminal; negative (-) terminal to PV inverter DC negative (-) terminal.

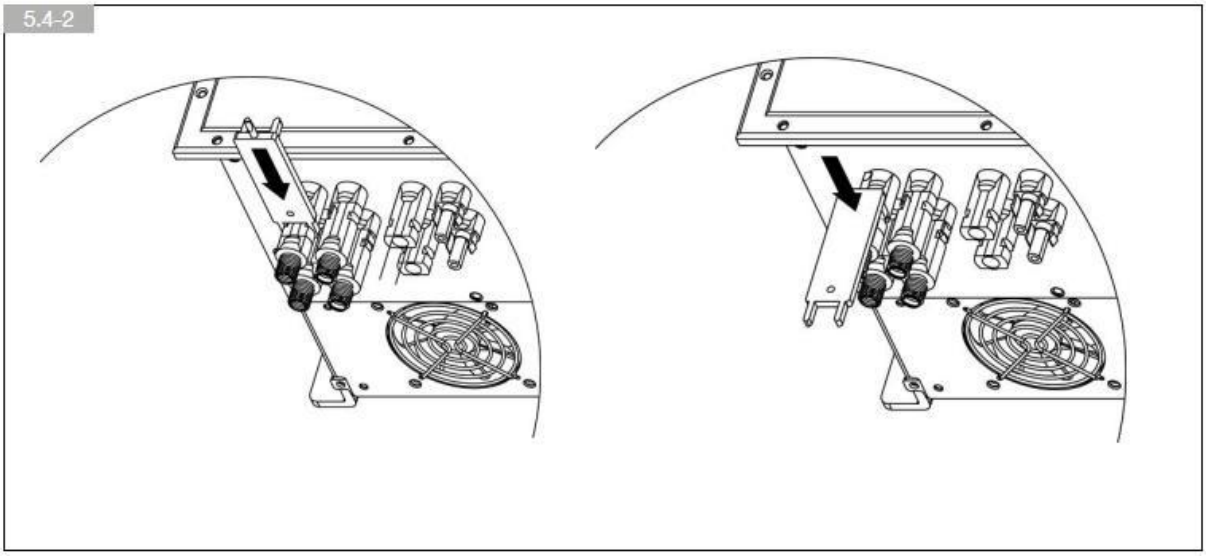


4. Each group of terminals of the DC 'inverter converts a DC current of maximum 24A.

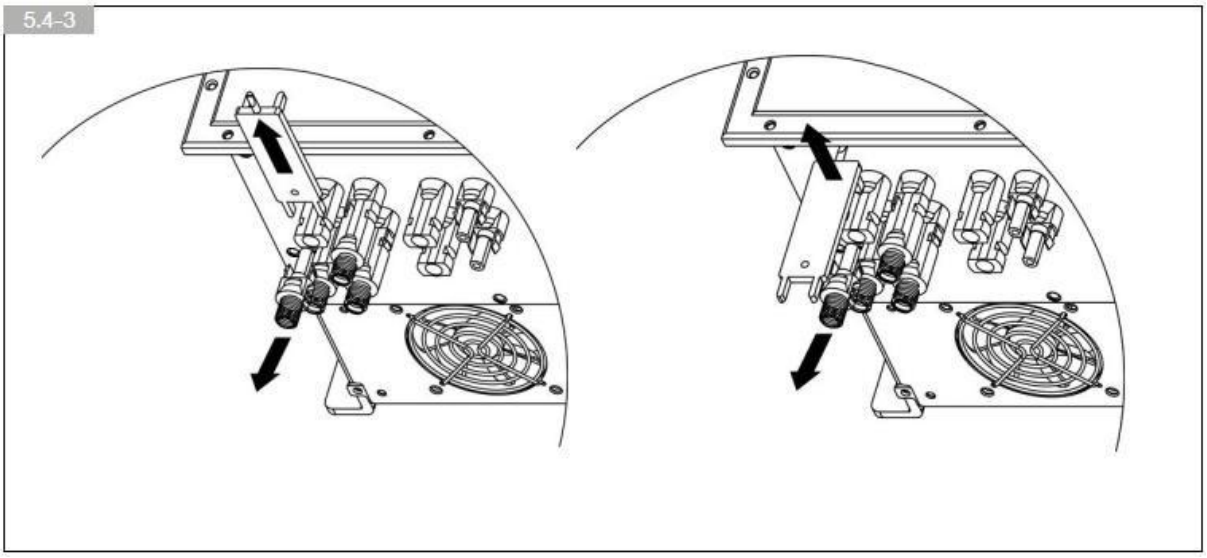
How to Disconnect MC4 DC connectors

The following pictures illustrates how to disconnect **MC4** DC connector by using a connector extractor as below figure shown, the connector extractor shall be found in accessories box shipped along with package of Inverter.

1. Insert the tool through the connector in either way to cramp its clips. As below figure shown:



2. After cramping the clips, pull the connector slightly downward to disassemble the DC cable.



Warning:

Don't disconnect DC power or cables while the Inverter is still feeding AC power to the grid, be sure to switch off AC power at first, then turn off DC switch (if present), and disconnect DC cables at last.

5.5.Switch grid connection

The AC power switch is an interface between the PV inverter and the public network.
The value of this switch (recommended 32 A,400V, 4 poles), must be designed by a qualified technician in order to meet the local safety regulations.
Is also recommended the use of a differential switch type A / AC value of> 300mA.

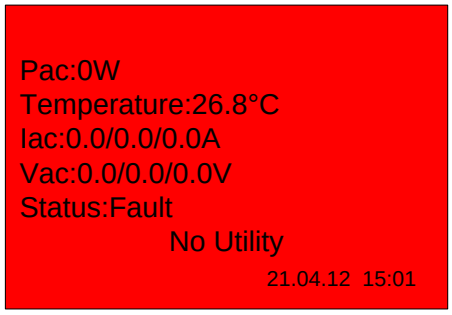
5.6-1

5.6. Post installation checklist

Before connecting the PV modules to make sure that the polarity of the DC terminals of each link is correct.
The incorrect connection may damage this equipment permanently

1. High voltages exist when PV-Panel is exposed to sufficient irradiation. Exposed terminals of PV-Panel are under tension, and can cause electric shock. Avoid making physical contact with those parts of the device.

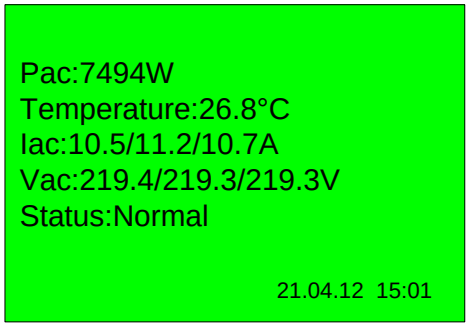
2. After PV-Panel is connected to the PV inverter, the output voltage is greater than 300VDC and when the AC grid is not connected to the Inverter, the Data Logger LCD displays the following:



Red backlight

3. Check the connection between PV inverter and the AC Connection System, and then check the connection between the Public Utility and the AC Junction Unit. Close the AC breaker or fuse in the unit.

4. Under normal operation, the Data Logger LCD shows the following as an example:



Green backlight

5. When the display is green, the Inverter is feeding power to the grid. Under such condition, you have installed the Inverter successfully.

6. OPERATION OF PV INVERTER

6.1. Initialization for Regulation Type Setting

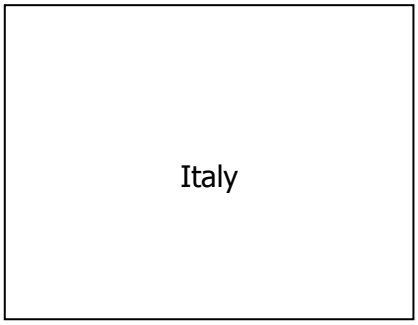
The Inverter provides a “Select Safety” function at the first time start-up as a process in which user is able to select the intended language displayed and regulation type before starting normal operation.
The Inverter will not able to operate normally before regulation setting is completed even though it is connected correctly at both DC input and AC output.

This operation is very delicate, since due to problems of yield, it is possible to run only once. in case of error, you must contact Socomec service center.

At first time them,

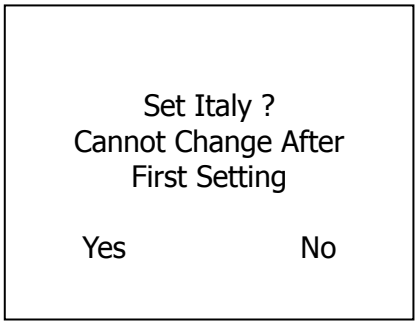
Green backlight

Will be given the opportunity to choose the country from several European countries,



Green backlight

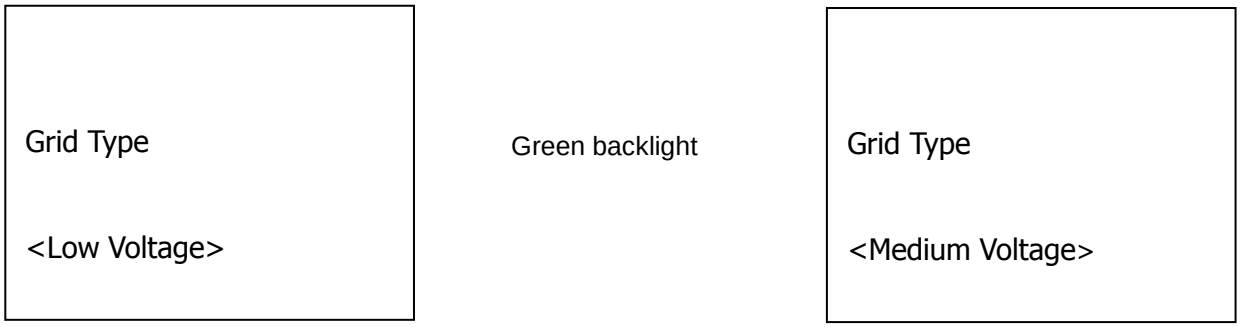
Selecting them by using the arrows”↑” e “↓”. Identified the country desired, press the "OK" key after which they will be asked to confirm acceptable again by pressing the "OK" key.



Green backlight

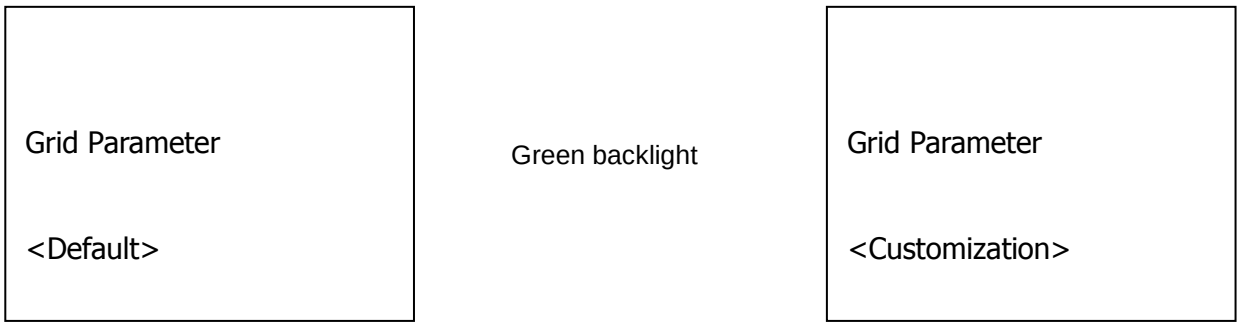
After that choose the grid type:

1. Low voltage: the delivery of the energy of the system is in low voltage
2. Medium voltage: delivery of the energy of the system is in medium voltage



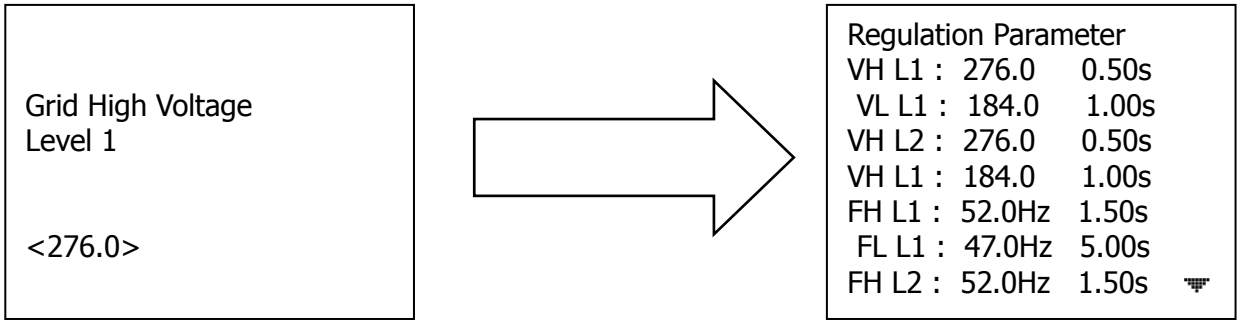
Then is necessary to set the inverter parameters:

1. Default: the parameters are the default parameter specified in the regulatory of the contry selected
2. Customization: All parameters are settable in accordance with the regulatory of the country selected



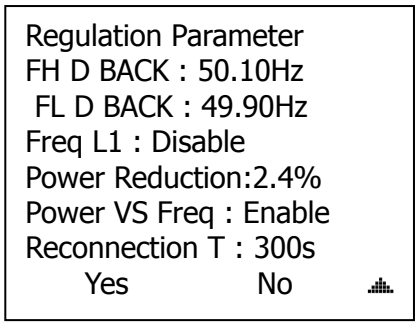
if it is set "cusomization" in subsequent windows will be set one by one all the parameters.

For accept press "OK".


Grid High Voltage
Level 1
<276.0>
Regulation Parameter
VH L1 : 276.0 0.50s
VL L1 : 184.0 1.00s
VH L2 : 276.0 0.50s
VH L1 : 184.0 1.00s
FH L1 : 52.0Hz 1.50s
FL L1 : 47.0Hz 5.00s
FH L2 : 52.0Hz 1.50s

At the end of all setting there is a summary window.

Press the "↓" arrow to scroll all parameter.



Green backlight

At the bottom of the page, if the parameter are all ok, select “YES” and press “OK” key for 5s to accept.

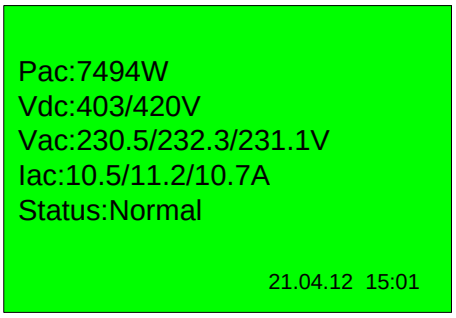
6.2. Automatic start

The PV inverter starts automatically when the DC power from the photovoltaic field is sufficient to run only after the initial startup.

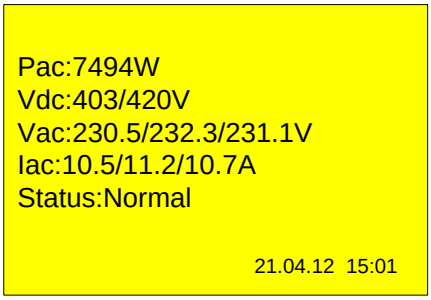
6.3. Check list for installation

There are 4 modes of operation. For each mode, there is a corresponding color and text to indicate the status.

1. **Normal**
   In this mode, Inverter continuously converts energy from solar generator to grid (utility). The corresponding color of LCD is green in this case.



2. **Recovery from Fault**
   In some situations such as abnormal voltage and frequency, the Inverter has to disconnect from grid. After the situations are cleared, Inverter recovers to normal condition. For the coming 48 hours, the LCD backlight will be yellow as following picture. If there is no further abnormal event after 48 hours of operation, the color switches back to green again.

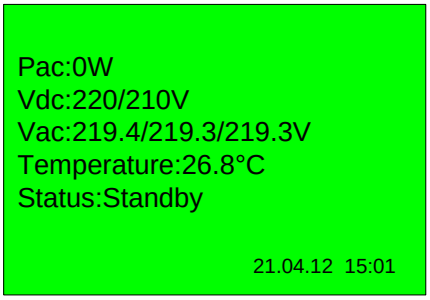


3. **During Fault**
   During grid fault or system failure (refer to “error message table” for further information) the Inverter disconnects from the grid, the backlight turns red, and alarm is ON to notify user. User can press “OK” button on navigation pad to clear fault notification. In this condition, please check the message. If the fault notification cannot be cleared, please contact with your local service.

4. **Shutdown**
   During night or heavily cloudy day, the Inverter automatically shuts down. In this condition, Data Logger and the navigation pad are inactive.

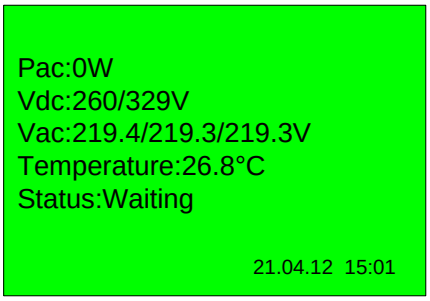
5. Three Operating States:

- **Standby**:
  During normal operation, the PV inverter is in “Standby” state when the open circuit voltage is between 200V to 250V.



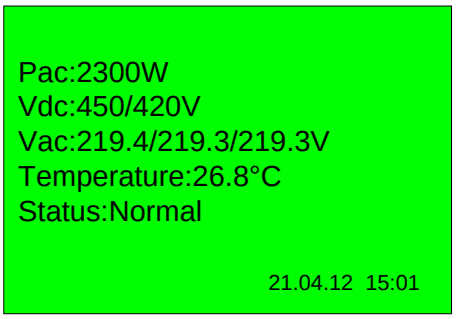
Green backlight

- **Waiting :**
  Between 251V and 349V at DC side, the Inverter is in “Waiting” state. In the meantime, the Inverter keeps checking both DC and AC conditions and waiting for connection.



Green backlight

- **Normal:**
  To be in “Normal” state, voltage on DC side must be 350V or above. To check the DC wire connection, this Inverter tries to disturb its input power for every starting-up. During the process, user can see the DC power reading drift.



Green backlight

6.4. Using the LCD Display and Data Logger

6.4.1. Operation

1. Keys on the data logger:

On the data logger, there are 5 keys used to change and operate. Generally, the functions of keys are defined as followings.

"→" : View the lower layer (1st to 2nd) or move the cursor right

"←" : View upper layer (2nd to 1st) or move the cursor left

"↑" : View the previous screen or move the cursor up

"↓" : View the next screen or move the cursor down

" OK " : Set or confirm

2. Back light of LCD

As described in previous section, the color of backlight changes according to operation status. To save power, the light remains illuminated only for 3 minutes after last operation. However, in case a failure or error occurs, other than the backlight goes red, the backlight flashes every second until user presses the key accordig to instruction on the LCD.

3. Audio Alarm

To inform the user, data logger will emit audio alarm in cases of following:

a. Inverter failure
b. Memory capacity of data logger is less than 5% remained
c. Convection fan is not able to rotate for any reason

This audio alarm can be disabled by "system information" menu. To do this consult the section "system information" at follow.

4. Behavior in case memory is reach to full condition

Once the capacity of memory is less than 5%, data logger will emit audible alarm. At that moment, user should manage the data inside and try to clear the memory by using a PC. In case user ignores the warning and does not clear the memory, after memory is 100% full, the latest data will overwrite the earlier ones.

6.4.2. LCD screens

1. Startup

After the Inverter starts up, the LCD shows the name of regulatory for wich it was setting and data logger firmware version. The frame lasts for 3 seconds and changes to text information below.

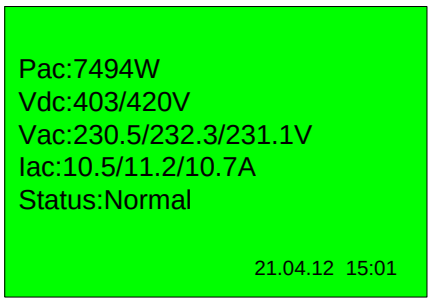
Green backlight

2. Text display

The display shows four measurements and one status. The bottom-right part of the display shows the time and date. On occurrence of a “warning” or “error” message, the bottom line “Status” is automatically replaced by the error message.

The user can change the four monitoring parameters.

a. Press “⟶” to highlight the monitoring parameter at the first line. By using “↑” and “↓”, the user can shift to the next line.
b. Press “OK” to begin setting the monitoring parameter.
c. Press “↑” or “↓” to select the monitoring parameter of the line.
d. Press “OK” to confirm.

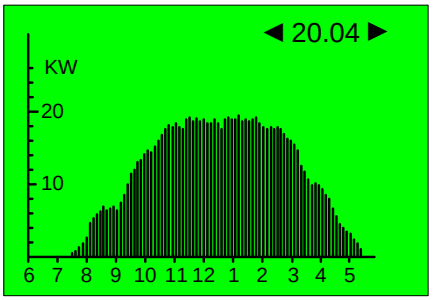


Green backlight

3. Daily graph

By pressing the "↓" key in the text display, screen on LCD is transformed to daily graph as below. The graph indicates the AC power trend of a specified date. Further explanations are stated below:

- Time-axis (x-axis): On the frame, the longest period is 12 hours. The number represents the hour. The first recorded data of a day is plotted on the first point of left side. In case the recorded data of a day is longer than 12 hours, press "OK" first and then press "⟶" and "⟵" to move the graph to time interested. Press "OK" again to terminate the moving.
- Power-axis (y-axis): From 0 to 24KW. Each point is the averaged power during 6-minute interval, each dot means 500W, the maximal dot number is 48.
- Date: On the upper right corner, the date of present display is shown. To see daily graph of expected day, press "⟶" and "⟵" to select

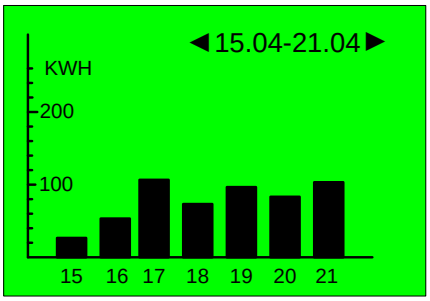


Green backlight

4. Weekly graph

Press the "↓" of daily display, LCD changes to the "Weekly Display" as below. For further explanations, see below:

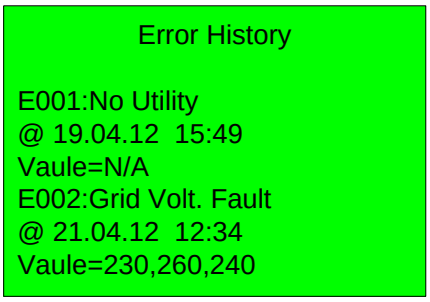
- Time-axis (x-axis): 7 days from Sunday of a week. The data at first point of left side is the data for Sunday.
- Generated KWh (Y-axis): The total generated energy in kWh of the day. From 0 to 240kWh. Each dot means 5kWh, the maximal dot number is 48.
- Week change: Press "⟶" and "⟵" to switch to the week interested. The corresponding dates on the upper-right corner can also be changed.



Green backlight

5. Error history

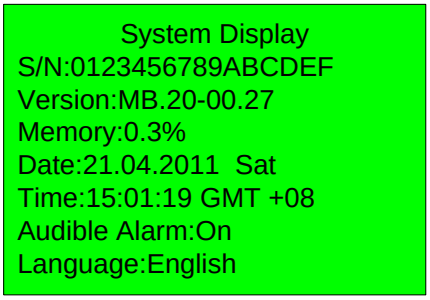
By pressing "↓" again on the "Weekly Display", the LCD changes to "Error History" as shown below. The LCD displays the last two recorded error events.



To see more error events, press "OK" first to toggle the display and then press "⟶" and "⟵".

6. System Information

By pressing "↓" again on "Error History", the LCD changes to the "System information" of the Inverter including serial number of the Inverter, firmware version, etc… as shown below.



The following are the monitoring parameters shown in "System Display":

- S/N: Serial number of the Inverter
- Version: Firmware version of the Inverter
- Memory: Memory status of the Data Logger
- Date: Date setting of the Inverter
- Time: Time setting of the Inverter
- Audio Alarm: Turn "On" or "Off" audio alarm
- Language: Language setting of display

To change the Date, Time, Audio and Language settings:

Press "⟶" and then press "↑" or "↓" to change the parameter to the desired setting.

Press "OK" to confirm. Use "↑" and "↓" to alter the value

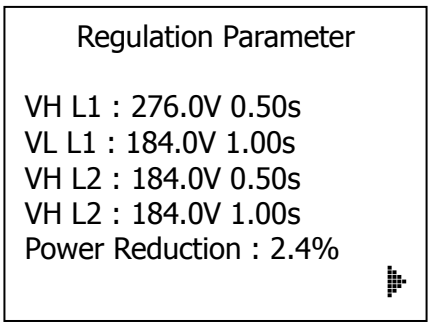
Press "OK" to confirm.

Press "← " to cancel a selection and complete the setting.

7. Regulation parameter

By pressing "↓" again on the "System Information", the LCD changes to "Regulation Parameter" as shown below. The LCD displays all the inverter parameters that have been stetted at initial setup.

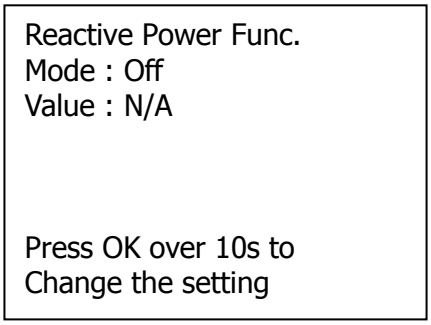
By pressing "⟶" is possible to scroll all the parameters.



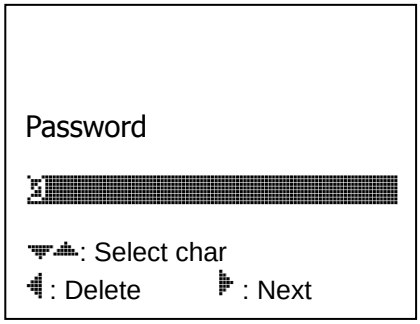
As long you remain on this screen is possible, by pressing the "OK" keys for 10 seconds and by insert a password "4613", to set all parameters again.
See "Grid Parameter" settings at point 6.1 for more details.

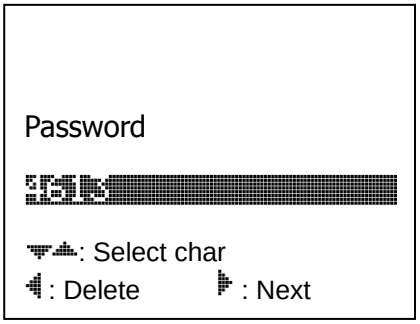
8. Reactive power function

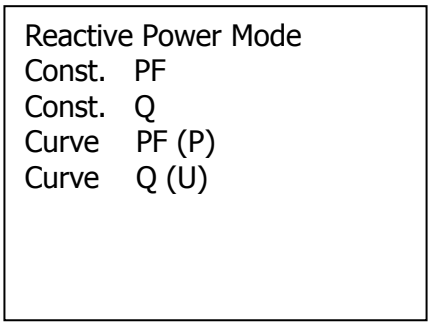
When is pressed "↓" again appears the "Reactive Power Function" screen.



By pressing the "OK" keys for 10 seconds and by insert a password "4613", is possible to choose a method of managing the reactive power, or if it is already active, is possible to disable it.

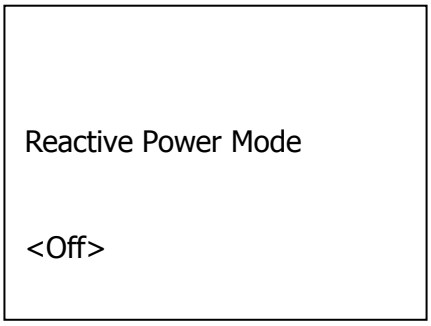






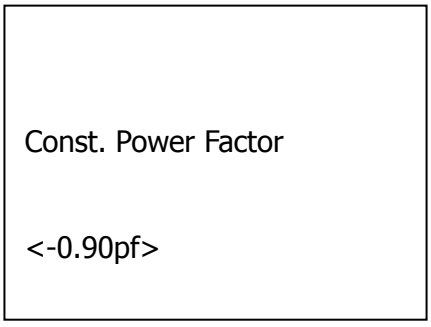
Once entered into the reactive power managing menu is possible to:

1. Reactive Power Mode: by pressing “OK” is possible to enable one of the four management arrangement of reactive power, or disable it.



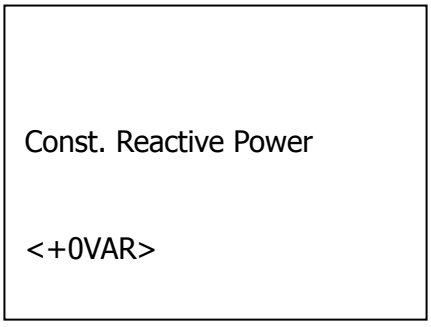
Select the desired function by pressing “↓” o “↑” and confirm pressing “OK”.

2. Const. PF: by pressing “OK” is possible to set the parameter of constant power factor function.



Select the desired value by pressing “↓” o “↑” and confirm pressing “OK”.

3. Const Q: by pressing “OK” is possible to set the parameter of constant reactive power function.

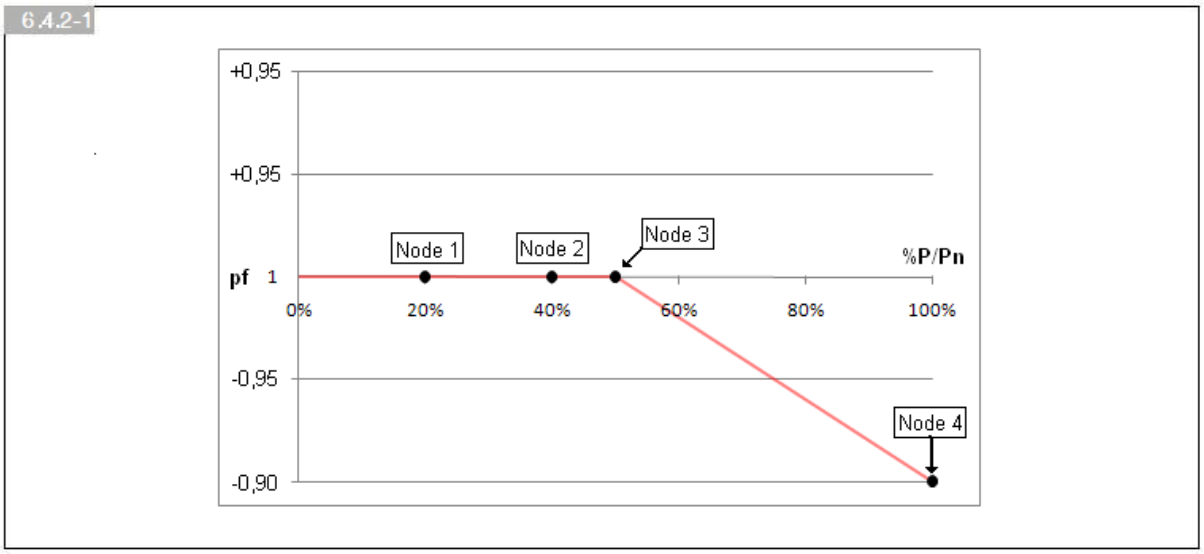


Select the desired value by pressing “↓” o “↑” and confirm pressing “OK”.

4. Curve PF(P): by pressing “OK” is possible to set the parameters of curve of management of the power factor in function of active power.

Power Factor Curve With Power Percent V lock-in: 241.4V V lock-out:230.0V Node 1: 20% +1.00pf Node 2: 40% +1.00pf Node 3: 50% +1.00pf Node 1: 100% -0.90pf

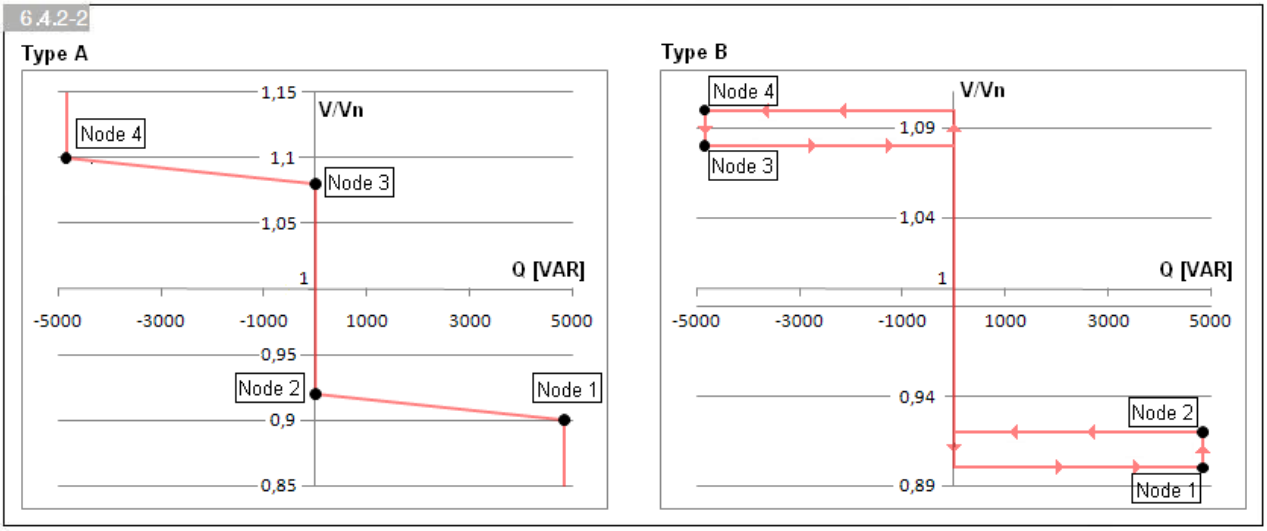
Select the desired value by pressing "↓" o "↑" and confirm each value pressing "OK".
The item in the "Power Factor Curve" setting page are refer at the following picture.



5. Curve Q(U): by pressing "OK" is possible to set the parameters of curve of management of the reactive power in function of grid voltage.

Q Curve VS Voltage % Type: A P lock-in: 20%Pn P lock-out: 5%Pn Node 1: 90% +48.4%Q/S Node 2: 92% + 0.0%Q/S Node 3: 108% + 0.0%Q/S Node 1: 110% -48.4%Q/S

Select the desired value by pressing "↓" o "↑" and confirm each value pressing "OK".
The item in the "Power Factor Curve" setting page are refer at the following picture.



9. Active power function

From the screen “Reactive Power Function”, by pressing “↓” again switches to “Active Power Func.”.
In this screen are only show if it is enable, and the value of a possible limitation of active power.

Active Power Func. P Limit : 100%Pn

7. INVERTER OPERATING STATUS

This Inverter is designed to be user-friendly; the status of the Inverter can be easily understood by reading the information shown on the front panel display or through remote monitoring. All possible messages are listed in the following table.

The Language Matrix of Display Messages (Continue in next page)

1. General System Messages

General System Messages						
Operation Status	**ENGLISH**	**DEUTSCH (German)**	**ESPAÑOL (Spanish)**	**ITALY**	**Français (France)**	**Nederlands (Dutch)**
Date Format	day.month.year 10.04.2011)	(day.month.year 10.04.2011)	(dia.mes.año 10.04.2011)	(day.month.year 10.04.2011)	(day.month.year 10.04.2011)	(dag.maand.jaar (10.04.2011)
Time format	hours:minutes (17:23)	hours:minutes (17:23)	horas:minutos (17:23)	hours:minutes (17:23)	hours:minutes (17:23)	uren:minuten (17:23)
System Display Menu	System Display	Systemanzeige	Pantalla inform.	Info. sistema	Affichage	Systeem informatie
Serial Number	S/N:xxxxxxxxxxxxxxx	S/N:xxxxxxxxxxxxxxx	S/N:xxxxxxxxxxxxxxx	S/N:xxxxxxxxxxxxxxx	S/N:xxxxxxxxxxxxxxx	S/N:xxxxxxxxxxxxxxx
Firmware Version	Version:xx.xx-xx.xx	Version:xx.xx-xx.xx	Versión:xx.xx-xx.xx	Vers.FW:xx.xx-xx.xx	Version:xx.xx-xx.xx	Versie:xx.xx-xx.xx
SD Card Memory	Memory:xx.x%	Speicher:xx.x%	Memoria:xx.x%	Memoria:xx.x%	Carte SD:xx.x%	Geheugen:xx.x%
Date Information	Date:dd.mm.yyyy Sun	Datum:dd.mm.yyyy So	Fecha:dd.mm.yyyy Dom.	Data:dd.mm.yyyy Dom.	Date:dd.mm.yyyy dim	Datum:dd.mm.yyyy Zo
	Date:dd.mm.yyyy Mon	Datum:dd.mm.yyyy Mo	Fecha:dd.mm.yyyy Lun.	Data:dd.mm.yyyy Lun.	Date:dd.mm.yyyy lun	Datum:dd.mm.yyyy Ma
	Date:dd.mm.yyyy Tue	Datum:dd.mm.yyyy Di	Fecha:dd.mm.yyyy Mar.	Data:dd.mm.yyyy Mar.	Date:dd.mm.yyyy mar	Datum:dd.mm.yyyy Di
	Date:dd.mm.yyyy Wed	Datum:dd.mm.yyyy Mi	Fecha:dd.mm.yyyy Mie.	Data:dd.mm.yyyy Mer.	Date:dd.mm.yyyy mer	Datum:dd.mm.yyyy Wo
	Date:dd.mm.yyyy Thu	Datum:dd.mm.yyyy Do	Fecha:dd.mm.yyyy Jue.	Data:dd.mm.yyyy Gio.	Date:dd.mm.yyyy jeu	Datum:dd.mm.yyyy Do
	Date:dd.mm.yyyy Fri	Datum:dd.mm.yyyy Fr	Fecha:dd.mm.yyyy Vie.	Data:dd.mm.yyyy Ven.	Date:dd.mm.yyyy ven	Datum:dd.mm.yyyy Vr
	Date:dd.mm.yyyy Sat	Datum:dd.mm.yyyy Sa	Fecha:dd.mm.yyyy Sab.	Data:dd.mm.yyyy Sab.	Date:dd.mm.yyyy sam	Datum:dd.mm.yyyy Za
Time Information	Time	Zeit	Hora	Ora	Heure	Tijd
Data Logger Alarm	Audible Alarm	Alarm	Alarma sonora	Allarme sonoro	Alarme sonore	Alarm
Turn on the audible alarm	On	Ein	Marcha	On	ON	Aan
Turn off the audible alarm	Off	Aus	Paro	Off	OFF	Uit

General System Messages						
Operation Status	**ENGLISH**	**DEUTSCH (German)**	**ESPAÑOL (Spanish)**	**ITALY**	**Français (France)**	**Nederlands (Dutch)**
Display Language selection	Language	Sprache	Idioma	Lingua	Langue	Taal
Display in English	English	Englisch	Ingles	Inglese	Anglais	Engels
Display in German	German	Deutsch	Aleman	Tedesco	Allemand	Duits
Display in Spanish	Spanish	Spanisch	Español	Spagnolo	Espagnol	Spaans
Display in Italian	Italy	Italienisch	Italiano	Italiano	Italien	Italiaans
Display in French	France	Französisch	Frances	Francese	Français	Frans
Display in Dutch	Dutch	Holländisch	Holandés	Olandese	Hollandaise	Nederlands

2. Meter Information Messages

Meter Information Messages						
Operation Status	**ENGLISH**	**DEUTSCH (German)**	**ESPAÑOL (Spanish)**	**ITALY**	**Français (France)**	**Nederlands (Dutch)**
The Real time output power	Pac:xxxxxW	Pac:xxxxxW	Pac:xxxxxW	Pac:xxxxxW	Pac:xxxxxW	Pac:xxxxxW
Instantaneous Input Power	Pdc:xxxx/xxxxW	Pdc:xxxx/xxxxW	Pdc:xxxx/xxxxW	Pdc:xxxx/xxxxW	Pdc:xxxx/xxxxW	Pdc:xxxx/xxxxW
Meter Information Messages						
Operation Status	**ENGLISH**	**DEUTSCH (German)**	**ESPAÑOL (Spanish)**	**ITALY**	**Français (France)**	**Nederlands (Dutch)**
PV Array Voltage	Vdc:xxx/xxxV	Udc:xxx/xxxV	Vdc:xxx/xxxV	Vdc:xxx/xxxV	VDC:xxx/xxxV	Udc:xxx/xxxV
PV Array Current	Idc:xx.x/xx.xA	Idc:xx.x/xx.xA	Idc:xx.x/xx.xA	Idc:xx.x/xx.xA	IDC:xx.x/xx.xA	Idc:xx.x/xx.xA
Accumulated Energy Information	Etot:xxxxxxxxx.xkWh	Etot:xxxxxxxxx.xkWh	Etot:xxxxxxxxx.xkWh	Etot:xxxxxxxxx.xkWh	Etot:xxxxxxxxx.xkWh	Etot:xxxxxxxxx.xkWh
Daily Energy	Etoday:xxx.xkWh	E-heute:xxx.xkWh	Ehoy:xxx.xkWh	Eoggi:xxx.xkWh	Ejour:xxx.xkWh	E-today:xxx.xkWh
Working Hours	H-total:xxxxxxhr	h-Gesamt:xxxxxxhr	H.TotalFunc.:xxxxxxhr	H.tot.funz.:xxxxxxhr	H.fonction:xxxxxxhr	h-Totaal:xxxxxxhr
Internal Temperature	Temperature:xx.x°C	Temperatur:xx.x°C	Temperatura:xx.x°C	Temperatura:xx.x°C	Température:xx.x°C	Temperatuur:xx.x°C
Grid Voltage	Vac:xxx.x/xxx.x/xxx.xV	Uac:xxx.x/xxx.x/xxx.xV	Vac:xxx.x/xxx.x/xxx.xV	Vac:xxx.x/xxx.x/xxx.xV	VAC:xxx.x/xxx.x/xxx.xV	Uac:xxx.x/xxx.x/xxx.xV
Grid Frequency	Frequency:xx.xHz	Frequenz:xx.xHz	Frecuencia:xx.xHz	Frequenza:xx.xHz	Fréquence:xx.xHz	Frequentie:xx.xHz
Safety Selection	Safety:VDE0126-1-1/A1	Safety:VDE0126-1-1/A1	Safety:VDE0126-1-1/A1	Safety:VDE0126-1-1/A1	Safety:VDE0126-1-1/A1	Safety:VDE0126-1-1/A1
	Safety:VDE-AR-N 4105	Safety:VDE-AR-N 4105	Safety:VDE-AR-N 4105	Safety:VDE-AR-N 4105	Safety:VDE-AR-N 4105	Safety:VDE-AR-N 4105
	Safety:RD1699	Safety:RD1699	Safety:RD1699	Safety:RD1699	Safety:RD1699	Safety:RD1699
	Safety:G83/1-1	Safety:G83/1-1	Safety:G83/1-1	Safety:G83/1-1	Safety:G83/1-1	Safety:G83/1-1
	Safety:G59 Issue 2	Safety:G59 Issue 2	Safety:G59 Issue 2	Safety:G59 Issue 2	Safety:G59 Issue 2	Safety:G59 Issue 2

3. General Status Information Message

General Status Information Messages						
Operating Conditions	**ENGLISH**	**DEUTSCH (German)**	**ESPAÑOL (Spanish)**	**ITALY**	**Français (France)**	**Nederlands (Dutch)**
Standby in input range 200V~259V	Status:Standby	Status:Standby	Estado:En espera	Stato:Standby	Etat:En attente	Status:Standby
Initialization & Waiting in input range 260V ~349V	Status:Waiting	Status:Warten	Estado:En proceso	Stato:In attesa	Etat:Prêt	Status:Wachten
Check Grid in input range 350V and above	Status:Checking xxxs	Status:Netz-Prüf xxxs	Estado:Chequeo xxxs	Stato:Test xxxs	Etat:Vérif. xxxs	Status:Controle xxxs
Inverter is feeding with the Grid	Status:Normal	Status:Normal	Estado:Normal	Stato:Normale	Etat:Connecté réseau	Status:Normaal
A system fault or Inverter fault happened	Status:Fault	Status:Fehler	Estado:Defecto	Stato:Errore	Etat:En défaut	Status:Fout
DSP Flash	Status:FLASH	Status:Flash	Estado:Actualizando	Stato:Aggiornamento	Etat:Mem. FLASH	Status:Flash
Slave Flash	Status:SLAVE FLASH	Status:2.Flash	Estado:Flash Sec	Stato:Aggiorn. Slave	Etat:FLASH "esclave"	Status:Slave Flash

4. General Warning and System Fault Messages

General Warning and System Fault Messages						
Operating Conditions	**ENGLISH**	**DEUTSCH (German)**	**ESPAÑOL (Spanish)**	**ITALY**	**Français(France)**	**Nederlands (Dutch)**
Grid measuring value is beyond the specification	Grid Fault	Netzfehler	Defecto de red	Errore di rete	Défaut réseau	Netfout
Measuring of Grid voltage is not in the operation range	Grid Volt. Fault	Fehler Netzspg.	Def. tension red	Err. Tens. rete	Déf. U(v) réseau	Netspanningsfout
Measuring of Grid Frequency is not in the operation range	Grid Freq. Fault	Fehler Netzfrq.	Def. frec. red	Err. Freq. rete	Déf. Freq réseau	Netfreq. fout
Earth Fault of the PV Panel	Isolation Fault	Isolationsfehler	Def. aislamiento	Err.Isolamento	Défaut isolation	Isolatiefout
AC Grid is not available	No Utility	Kein Netz	Red ausente	Rete assente	Réseau absent	Net niet aanw.
Input voltage is higher than specification	PV over voltage	DC-Überspannung	Sobretensión DC	Sovratensione DC	Surtention DC	DC-overspanning
There is not enough space to store data into SD card	Memory Full	Speicher voll	Memoria llena	Memoria piena	Mémoire pleine	Geheugen vol
Reading of SD card failed	SD Card access error	SD Zugriff-Fehler	Error lectura SD	Err. accesso SD	Err. Accès SD	SD kaart toegangsfout
Leakage current on ground conductor is too high	RCMU Fault	Fehlerstrom	Defecto a tierra	I dispers.Alta	Défaut terre	Aardfout

5. **General Inverter Fault Messages**

General Inverter Fault Messages						
Operating Conditions	**ENGLISH**	**DEUTSCH (German)**	**ESPAÑOL (Spanish)**	**ITALY**	**Français(France)**	**Nederlands (Dutch)**
Output DC Sensor is abnormal	DC Sensor Fault	DC Sensor Fehler	Defecto sensorDC	Err. Sensore DC	Err capteur DC	DC sensor fout
CPLD Version Incorrect	CPLD Ver. Fault	CPLD Ver. Fehler	Fallo CPLD Ver.	Errore CPLD Ver.	Err CPLD Ver.	CPLD Ver. Fout
Voltage level of DC BUS is lower than expected	Low DC Bus	DC Bus zu tief	Bus DC bajo	DC Bus basso	Entrée 1 faible	DC bus laag
Voltage level of DC BUS is higher than expected	High DC Bus	DC Bus zu hoch	Bus DC alto	DC Bus alto	Entrée 1 élevée	DC bus hoog
The reading between Master and Slave CPU is not consistent	Consistent Fault	Konsistenzfehler	Defec.Coherencia	Err. processore	Err. processeur	CPU fout
Firmware version of DSP and Slave CPU is mismatch	M-S Ver. Fault	M-S Ver. Fehler	Ver. M-E incomp.	FW incompatibile	Err applicatif	M-S Ver. Fout
Output Relay is failed to start	Relay Failure	Relaisfehler	Fallo relé	Errore Relè	Défaut relais AC	Relaisfout
Communication between Data and Slave CPU failed	USB CONNECT	USB angeschlossen	Conexión USB	Connessione USB	Connection USB	USB verbonden

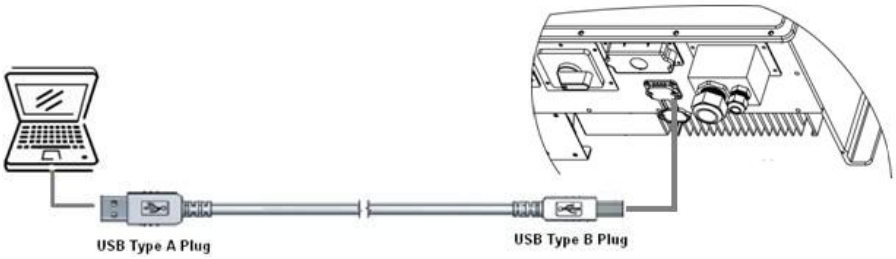
General Inverter Fault Messages						
Operating Conditions	**ENGLISH**	**DEUTSCH (German)**	**ESPAÑOL (Spanish)**	**ITALY**	**Français(France)**	**Nederlands (Dutch)**
Communication failed between Master and Slave CPU	Sci Failure	CPU Fehlfunktion	Fallo en 1 CPU	Err.com.interna	Err. Com proces.	CPU fout
Input current of boost module is too high	Over Boost Curr.	Over Boost Curr.	Sobreint.Exc.Reg	Sovracorrente	Cour. Boost haut	Over Boost Curr.
Input current of IGBTs is too high	Over Inv Curr.	Eingang Überlast	Int. limite Inv	I Inverter alta	Courant>Onduleur	Max. inv. Stroom
PV Panel is not able to identify	PV Connect Fault	PV Verbdg.fehler	Defecto conex.PV	Err conness. PV	Err. Connect. PV	PV verbind. fout
IGBTs start Failed	Inv Start Fault	Inv Start Fault	Def.arranque Inv	Err.attivazione	Déf. Démarrage	Inv Start Fault
Internal Cooling Fan is not working	Internal Fan Lock	Lüfter blockiert	Bloq.vent.Intern	Ventil.int.blocc	Verr. Ventil Int	Int.vent.geblokk
External Cooling Fan is not working	External Fan Lock	Lüfter blockiert	Bloq.vent.extern	Ventil.est.blocc	Verr. Ventil Ext	Ext.vent.geblokk

8. COMUNICATIONS

8.1.USB (on Inverter)

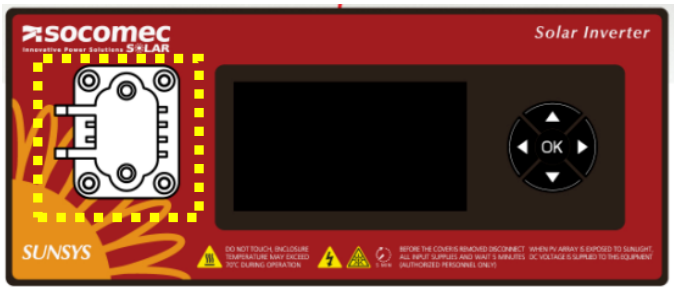
The PV inverter is equipped with a versatile communications interface, a USB port at underside of the device, which allows user to use to monitor the real-time status of multiple Inverters. Firmware upgrade is also conducted via this interface.

Connecting laptop PC to Inverter via USB type-A to type-B adapter cable.



8.2.SB Interface (Data Logger)

The Data Logger is fit with a B type USB connector for your PC USB host interface. Open the USB socket cover before use.



9. TROUBLE SHOOTING

PV inverter requires very little maintenance. When unexpected situation occurs, please refer to the following table for quick troubleshooting before contacting your local service. The following table lists common fault messages and ways to cope with the fault or error.

9.1. General Failures Analysis and Trouble Shooting Actions

	Fault Message	Fault definition	Possible Causes	Proposed Actions for End-user	Proposed Actions for Professionals
System Fault	**RMCU Fault**	The ground current detected by Inverter is higher than threshold after inverter connected to AC gird	1. Obstacle, humidity or water exits between AC LINE and/or NEUTRAL to earth ground 2. Obstacle, humidity or water exits between AC LINE and/or NEUTRAL to earth ground in the junction box 3. The Insulation of AC wires is broken that could be bit by rat or any animals 4. Inverter is abnormal	1. Disconnect DC/AC connection of Inverter by turn off the switch. 2. Check the DC/AC wires of the PV system. Clear obstacle ONLY IN SAFE CONDITIONS 3. Reconnect DC/AC connection, check the status of Inverter 4. If the problem persists, call local service *Notes: An insulation gloves must be wearing during procedures d.	1. Disconnect AC side of Inverter by turn off the AC switch 2. Disconnect the DC side from the Inverter 3. Check both the AC and DC wiring and insulation 4. Reconnect AC/DC connection, check the status of Inverter 5. If the problem persists, please ➢ Update the firmware according to instructions, or ➢ Replace the Inverter *Notes: An insulation gloves must be wearing during procedures
	Isolation Fault	The ground current detected by Inverter is higher than threshold before inverter connected to AC gird	1. Obstacle, humidity or water exits between DC side (PV panel) to earth ground 2. Obstacle, humidity or water exits between DC side (PV Panel) to earth ground in the junction box 3. The Insulation of DC wires is broken that could be bit by rat or any animals 4. Inverter is abnormal	1. Disconnect DC/AC connection of Inverter by turn off switch. 2. Check the DC/AC wires of the PV system. And Clear obstacle ONLY IN SAFE CONDITIONS 3. Reconnect DC/AC connection of Inverter, check the status of Inverter 4. If the problem persists, call local service Notes: An insulation gloves must be wearing during procedures	1. Disconnect AC side of Inverter by opening AC switch 2. Disconnect the DC side from the Inverter 3. Check both the AC and DC wiring and insulation 4. Reconnect AC/DC connection, check the status of Inverter 5. If the problem persists, please ➢ Update the firmware according to instructions, or ➢ Replace the Inverter Notes: An insulation gloves must be wearing during procedures

	Fault Message	Fault definition	Possible Causes	Proposed Actions for End-user	Proposed Actions for Professionals
	Grid Fault **(Grid Volt)** **(Grid Freq)**	Grid measured data is beyond the specification (voltage & frequency)	1. The detected AC voltage is beyond/under the setting of Inverter 2. The detected AC frequency is beyond/under the setting of Inverter 3. AC connection is not correct 4. Grid condition is weak or unstable 5. Other high-power consumption device is affecting the grid system 6. The setting of Inverter is deviated from its default values 7. Inverter is abnormal	1. Disconnect and reconnect the AC grid to see if inverter can be operated normally 2. If problem still occurred, check the reading value of AC grid from the LCD display of Inverter. 3. If this problem occurs seldom (such as 1 time a day), no action is necessary 4. If the problem occurs frequently, do the actions below 5. Find the device with high power consumption near your AC system 6. Use Inverter software to check the setting of Inverter. The setting should be in the range listed in specification 7. If the settings are not correct, call your service for changing 8. Use Inverter software or monitoring device to collect data. Send the data to professionals for further investigation 9. Consult your utility power supplier, understand the grid conditions 10. Request help from the installer	1. Disconnect and reconnect the AC grid to see if inverter can be operated normally 2. If problem still occurred,, check the reading value of AC grid from the LCD display of Inverter. 3. If reading value is within specification, check the system connection including polarities and security first 4. Find the devices with high power consumption near the AC system 5. Consult the utility power supplier, understand the grid conditions regarding the local grid code 6. Use Inverter software to monitor the frequency and voltage 7. If the measured data beyond the setting, under the permission of utility supplier, use the software to change parameters 8. If the situation is not improved after changing parameters, please 9. Update the firmware according to instructions, or 10. Replace the Inverter
	No Utility	Inverter is not able to detect AC voltage	1. Grid is not available 2. AC connection is incorrect 3. AC switch between Inverter and utility is not ON 4. AC fuse and/or breaker is open 5. Inverter is abnormal	1. Make sure the breaker and switch on AC side are close 2. Check the AC wiring 3. If the problem continues, call your local service	1. Make sure the breaker and switch on AC side are close 2. Check the AC wiring 3. If the problem continues, replace the Inverter
	PV over Voltage	The detected PV voltage is higher than specification	1. The PV array voltage is too high 2. DC input side of Inverter is abnormal	1. Open DC connection of Inverter and reconnect 2. If the fault continues, call your local service	1. Check the open PV voltage, and see if it is more than or too close to specification 2. If PV voltage is much less than specification and the problem still occurs, please replace the Inverter

	Fault Message	Fault definition	Possible Causes	Proposed Actions for End-user	Proposed Actions for Professionals
	Consistent Fault	The readings of 2 microprocessors are inconsistent	1. Software problem 2. Circuits inside Inverter are abnormal 3. Inverter is abnormal	1. Open all DC connections of Inverter 2. Wait for 3 minutes 3. Reconnect DC connection and check 4. If the fault continues, call your local service	1. Open all DC connections of Inverter 2. Wait for 3 minutes 3. Reconnect DC connection and check 4. If the fault continues ➢ Update the firmware according to instructions, or ➢ Replace the Inverter
Inverter Failure	**Over Temperature**	The detected temperature is high	1. Ambient temperature is too high 2. Heat dissipation problem might be occurred 3. Inverter is abnormal	1. Make sure the ambient temperature of installation is less than 55°C 2. Check the space near the heat sink 3. Remove any obstacle that block the heat dissipation near heat sink 4. Call local service if the problems persists	1. Make sure the ambient temperature of installation is less than 55°C 2. Check the installed location which should be not directly to the sun 3. Check the required space near the heat sink and the air flow area of heat sink ensure it is clear 4. Remove any obstacle that block the heat dissipation near heat sink 5. If the problem persists, replace it
	Relay Fault	The checking of AC relay is abnormal	Inverter is abnormal	1. Disconnect ALL PV (+) and PV (-) 2. Wait for 1 minutes 3. After no display on LCD, reconnect the DC again and check 4. If the fault message still appears again after restart, call your local service	1. Make sure installation is configured under specification 2. Processes the same actions again as left column mentioned 3. If the problem still persists, please try to ➢ Upgrade the latest firmware according to instruction or ➢ Replace the unit
	DC INJ High	The detected DC current of Hall sensor component of AC output side is higher than permission	1. The Hall sensor at output is abnormal 2. DC current of AC grid is higher than the permissible value. 3. Inverter is abnormal	1. Observe the faulty condition for 1 minute. 2. If it does not restore to normal operation, please call service.	1. Reconnect DC connection and check 2. If the fault continues ➢ Update the firmware according to instructions, or ➢ Replace the Inverter
	EEPROM Failure	Reading or writing of EEPROM of control board inside Inverter is abnormal	1. Operating Firmware is abnormal 2. Circuits of control board inside Inverter are abnormal 3. Inverter is abnormal	1. Disconnect PV (+) and PV (-) from the input, start the unit again. 2. If it does not work, please call service.	1. Do the same actions as left column again 2. If the fault continues ➢ Update the firmware according to instructions, or ➢ Replace the Inverter
	SCI Failure	Communication between the two CPUs is abnormal	. 1. Operating firmware is abnormal 2. Circuits of control board inside Inverter are abnormal 3. Inverter is abnormal	1. Disconnect PV (+) and PV (-) from the input, start the unit again. 2. If it does not work, please call service.	1. Do the same actions as left column again 2. If the fault continues ➢ Update the firmware according to instructions, or ➢ Replace the Inverter

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	Fault Message	Fault definition	Possible Causes	Proposed Actions for End-user	Proposed Actions for Professionals
	High DC Bus	DC voltage of DC BUS that inside Inverter is higher than expectation	DC Input voltage that feed to DC BUS is too high	1. Disconnect PV (+) and PV (-) from the input, start the unit again. 2. If so, please call service.	1. Do the same actions as left column again 2. Confirm the configuration of the PV Panel to ensure the it is used within specification 3. If the fault continues ➢ Update the firmware according to instructions, or ➢ Replace the Inverter
	Low DC Bus	DC voltage of DC inside Inverter is lower than expectation	DC Input voltage that feed to DC BUS is too low		
	DC Sensor Fault	The DC sensor at output is abnormal	1. Operation firmware is Abnormal 2. Detected current of Hall sensor is abnormal	1. Disconnect PV (+) and PV (-) from the input, start the unit again. 2. If it does not work, please call service.	1. Do the same actions as left column again 2. If the fault continues ➢ Update the firmware according to instructions, or ➢ Replace Inverter

Warning: Dangerous high voltage exists on both DC and AC wires and connections. For end-user, Please do NOT touch any live parts.

10. PREVENTIVE MANTENANCE

Although PV inverter requires very little maintenance, the following inspections at regularly would help to ensure PV Inverter operation with optimal performance.

10.1. Visual Inspection

Check the Inverter and cables for any signs of external damage. Contact your installer immediately if you find any defects. **Do not carry out any repairs on your own.**

10.2. Checking and Maintenance

Asking your installer to check for proper Inverter operation at regularly is the measure we suggested for preventative maintenance.

The following check is the key points:

1. Check If the fan guard is covered with debris or dust, get rid of it if find any.
2. Check heatsink to ensure no barrier blocking its air flow.
3. Inspect for corrosion, especially at connecting point.
4. Verify all connections are firmly tightened periodically.
5. Clean the exterior of the unit periodically with a damp cloth to prevent Inverter from accumulation of dust and dirt, Keep warranty label intact anyhow.
6. To get optimal performance, PV modules cleaning periodically would also be essential due to it is prone to dust and dirt accumulation.

Warning: To avoid risk of electric shock, AC and DC power shall be switched off whenever personnel need to contact PV modules under any circumstances.
Hot Surfaces: Although designed to meet international safety standards, the PV inverter can become hot during operation. Do not touch the heat sink or peripheral surfaces during or shortly after operation.

10.3. Cleaning and Swapping Cooling Fan Module

Ask your installer to clean fans if dust or debris accumulated.

Exchange procedures of fan module for the ***SUNSYS-B10*** model:

1. Disconnect the AC power and the DC power of PV inverter.
2. Unfasten all the screws of fan module as figure indicated below:

10.3-1

3. Take off the fan module by disconnect its cable adapter as figure indicated below:

10.3-2

4. Clean fan with damp cloth or soft brush tenderly if needed.

5. If fan module is damaged or malfunctioned permanently, please make a replacement by a new fan module.

6. Assemble the fan module in the reverse order of above procedures.

7. Check Inverter resumes normal operation after restart.

11. SPECIFICATION

11.1. Electrical Specification

Model	SUNSYS-B10
Input (DC)	
Nominal DC voltage	720 V
Max. PV open voltage	1000V
System start-up voltage	260V
Initial feeding voltage	350 V
Shutdown voltage	Typical 200V
Working voltage range	250 ~ 1000V
MPPT Full rating voltage range	350 ~ 850 V
MPPT efficiency	> 99%
Number of MPP tracker(s)	2
Maximum DC power	10500W
Maximum DC current	16A × 2
Max. number of parallel strings	2 × 2
External DC Circuit Breaker	20A x 2
Max. Inverter Backfeed Current to the PV Array	300mA
DC insulation resistance	> 1. 2 MΩ
DC insulation	Transformerless
Output (AC)	
Nominal AC power	10kW/ 10kVA
Max. AC power	10kW/ 10kVA
Nominal AC current	14.5A
Max. AC current	16A
Current (Inrush)	65A
Max. Output Fault Current	30A
AC Max. Short Circuit Current	60A
DC current injection (Max.)	20mA
AC grid voltage / Range	230 / 400Vac ±20%, 3ψ 4W+PE
AC grid frequency / Range	47 -52Hz
O/P current distortion (THD i)[4]	< 3%

Model	SUNSYS-B10
Phase shift (cosψ) at nominal output power (adjustable)	>0.99 (±0.8 on demand)
Efficiency	
Max. conversion efficiency	≧ 98.0%
European efficiency	≧ 97.2%
General Data	
Topology	Transformerless
Power consumption: standby / night	≦ 20W / ≦ 1W
Protection degree	Outdoor / Chassis: IP65 / Fan: IP55
Heat dissipation	Force air cooling, variable fan speed according to temperature on heatsink
Acoustic noise level	≦ 55dB(A)
Operating temperature range	- 20 ~ + 60℃
Continuous Output power temperature range	- 20 ~ + 45℃
Max O/P power (60^0C, nominal voltage, linear de-rating)	10000W
Max. Operating Temp. without derating for nominal voltage	45^0C
Humidity	100%, condensing
Altitude	Up to 2000m without power derating
Hazard substance restriction	Lead free, complied with RoHS GP2
Ground fault protection	Internal RCMU and Isolation detection function
DC disconnect (Optional)	EN/IEC standard approved DC Switch
Communication (Optional)	Standard: USB B type,
Front Bezel	Data logger - Display: 128 × 64 pixels - Function key × 5 - Standard: embedded - Optional: removable
Normative references	

Model	SUNSYS-B10
Regular Safety	IEC 62109-1: 2010, EN 62109-1: 2010 IEC 62109-2: 2011, EN 62109-2: 2011
EMC	EN 61000-6-2: 2005 EN 61000-6-3: 2007/A1: 2011
DC Switch (Optional)	EN 60947-1 EN 60947-3
CE	LVD: 2006/95/EC EMC: 2004/108/EC

11.2. Load Graphs

Load graphs are the typical efficiency charts that related to V_{DC} and P_{AC} is and the output power within the operation range can be determined by the different level of input voltage as power curve that shown in the following: